

**ROCKY FLATS PLANT
ENVIRONMENTAL RESTORATION PROGRAM**

**SITE HEALTH AND SAFETY
PROGRAM PLAN**

AUGUST 13, 1990

EG&G- Rocky Flats, Inc.

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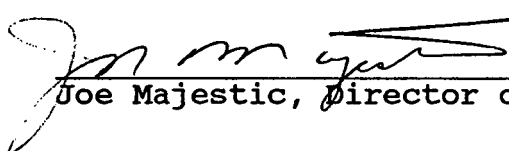
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BY	G. T. Ostdiek <i>120</i>
DATE	<i>5-19-93</i>

ENVIRONMENTAL RESTORATION HEALTH & SAFETY PROGRAM PLAN
REVIEW AND APPROVAL


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CHAPTER 1

INTRODUCTION

1.0 Overview

This document is the Health and Safety Program Plan (HSPP) for Environmental Restoration Department (ER) program activities at the Rocky Flats Plant (RFP). The RFP is a government-owned, contractor-operated facility owned by the U.S. Department of Energy (DOE) and operated by EG&G-Rocky Flats, Inc. (EG&G).

1.1 Policy

EG&G, in conjunction with the DOE, has voluntarily adopted the Federal Occupational Safety & Health Administration's (OSHA) standard for hazardous waste site workers (29 CFR 1910.120) for applicable operations at Rocky Flats. Some sections of the OSHA standards are superseded by more restrictive policies and procedures established by EG&G, the Department of Energy and/or other government agencies. The intent of this written program is to integrate the performance requirements of the OSHA standard, with existing Rocky Flats standards, in a manner which best serves the health and safety of workers, visitors and the surrounding population.

It is the intention of EG&G that this plan establish the framework for all site-specific health and safety plans. EG&G fully understands the need for project-specific flexibility and allows for sound professional judgement in the implementation of this program. However, each site specific plan shall be evaluated by the Health and Safety Liaison officer with the technical

support from the various health and safety divisions, including review by certified industrial hygienists, for consistency with the minimum requirements of regulating agencies and sound safety practices.

This written health and safety program plan is designed for EG&G employees. Subcontractors of EG&G must incorporate and enforce requirements which are at least as stringent as those presented in this document. (See Site Health and Safety Plan Workbook, Appendix F for the Contractor Health and Safety Plan Evaluation.)

The Rocky Flats Plant incorporates into its plans and procedures for facilities and waste operations the concept of "AS LOW AS REASONABLY ACHIEVABLE" (ALARA) for controlling employee and environmental exposure to both radioactive and non-radioactive hazardous materials.

1.2 Application

This written health and safety program plan establishes the minimum health and safety requirements for all Rocky Flats DOE, EG&G and subcontract personnel who physically work on any of the Environmental Restoration designated hazardous waste sites¹. This plan also describes the basic techniques for implementation of the health and safety program. Individuals responsible for developing site specific plans are encouraged to use this document and the Workbook as a guide to Rocky Flats resources. These resources include in-house health and safety professionals, written health and safety procedures, emergency contacts and existing site characterizations.

¹ Appendix A contains OSHA Regulation 29 CFR 1910.120. Page 1 of that document describes the regulatory scope and application in detail.

This ER Health and Safety Program Plan and Workbook have been reviewed by appropriate Health and Safety Departments and have been approved by the Environmental Restoration Director, the Health and Safety Director, the Environmental Restoration Health and Safety Officer and the Health and Safety Liaison Officer.

1.3 Related DOE Orders and EG&G Practices

The following orders and procedures represent major references which supplement this document. All of these documents are available to Environmental Restoration Subcontractors at the ER library in building T-130B. The Health and Safety Liaison Officer also maintains a complete set of these references.

- o RFP Health and Safety Practices Manual
- o RCRA Permitting and Compliance Standard Operating Procedure
- o Rocky Flats Emergency Plan
- o DOE Order 5000.3, "Unusual Occurrence Reporting System"
- o DOE Order 5480.1B, "Environmental Safety and Health Program for Department of Energy Operations"
- o DOE Order 5480.4, "Environmental Protection, Safety, and Health Protection Standards"
- o DOE Order 5480.8, "Contractor Occupation Medical Program"
- o DOE Order 5480.9, "Construction Health and Safety Program"
- o DOE Order 5480.10, "Contractor Industrial Hygiene Program"
- o DOE Order 5480.11, "Radiation Protection for Occupational Workers"
- o DOE Order 5483.1A, "Occupation Health and Safety Program for DOE Contractor Employees at Government-Owned, Contractor-Operated Facilities"

- o Federal Facility Agreement and Consent Order, commonly referred to as the Interagency Agreement or IAG stipulated among DOE, the U.S. Environmental Protection Agency (EPA), and the Colorado Department of Health (CDH) (Tables 5 and 6 of this Agreement are included in Appendix B.).

1.4 Description of Facility

The Rocky Flats Plant occupies 6550 acres of federally owned land approximately 16 miles northwest of Denver, Colorado (Figure 1-1). The production areas are located within a security-fenced area of 384 acres (Figure 1-2).

The plant is a DOE facility that produces components for nuclear weapons from plutonium, uranium, beryllium and stainless steel. Production activities include metal fabrication and assembly; chemical recovery and purification of transuranic radionuclides; and related quality control functions. Research and engineering programs in chemistry, physics, materials technology, ecology, nuclear safety and mechanical engineering support these production activities.

Product storage and waste management practices associated with many years of production operations have led to environmental contamination which is being assessed under the direction of the Environmental Restoration Department.

1.5 Anticipated Activities and Work Tasks

The ER Remedial Action Program's (Program) purpose is to investigate and clean up contaminated sites at DOE facilities. The Program is being implemented in five phases. Phase 1, Installation Assessment, includes site inspections and preliminary assessments of potential

environmental concerns. Phase 2, Remedial Investigation, includes planning and implementing sampling programs to determine the areal extent of contamination at specific sites and evaluating potential contaminant migration pathways. Feasibility Studies, Phase 3, are conducted to evaluate remedial alternatives for mitigating environmental concerns identified during the Remedial Investigation. Phase 4, Remedial Design (RD) and Remedial Action (RA), is the final design and implementation of the selected remedial action alternative. The fifth and last phase of the Program, Compliance and Verification, implements monitoring and performance assessment programs to verify and document the adequacy of the remedial actions.

A preliminary workplan has been developed by ER to investigate numerous sites and determine the need for remediation and appropriate corrective action. These sites are divided, by location and/or type of proposed remedial action, into ten Operable Units (OU). This workplan and a preliminary schedule of proposed ER milestones are presented in Tables 5 and 6 of the Federal Facilities Agreement and Consent Order of March, 1990 (IAG). Tables 5 and 6 of the IAG are included as Appendix B of this document. Tasks specified in the workplan include assessment and/or closure of spill sites, chemical and equipment storage areas, landfills, process equipment, liquid retention ponds, disturbances identified on aerial photographs, underground storage sites and reservoirs in the vicinity of the site.

1.6 Summary of Major Contaminants

Raw materials, waste and end products from operations at the Rocky Flats Plant create unique health hazards for workers conducting environmental restoration activities at the plant. The primary contaminants at the site include radiological agents, metals and organic compounds.

Radioactive isotopes used or generated at the RFP, include plutonium, uranium, americium, tritium and related decay products. These chemicals can be present in a liquid, solid, or gaseous state. Varying levels of radioactivity are expected at many of the ER sites.

A wide assortment of metals are utilized by operations at the RFP. Metals identified in the analyses of waste processing streams include aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, silver, sodium, vanadium and zinc. Therefore, any or all of these constituents may be present at ER sites designated for investigation or cleanup.

Chlorinated organic compounds, including solvents and polychlorinated biphenyls (PCBs), have been used historically in processes or equipment at the RFP. Trichloroethylene and perchloroethylene have been detected in ground water within the plant boundaries. Non-chlorinated contaminants, such as acetone, toluene, benzene, and xylene have also been disposed of or have leaked from containers and may be present. Due to the mixture of chemical contamination present, decomposition products may also be found.

A variety of corrosive chemicals are used for processing, research, development and analytical work. Samples, groundwater, surface water or other liquids or gases may be corrosive.

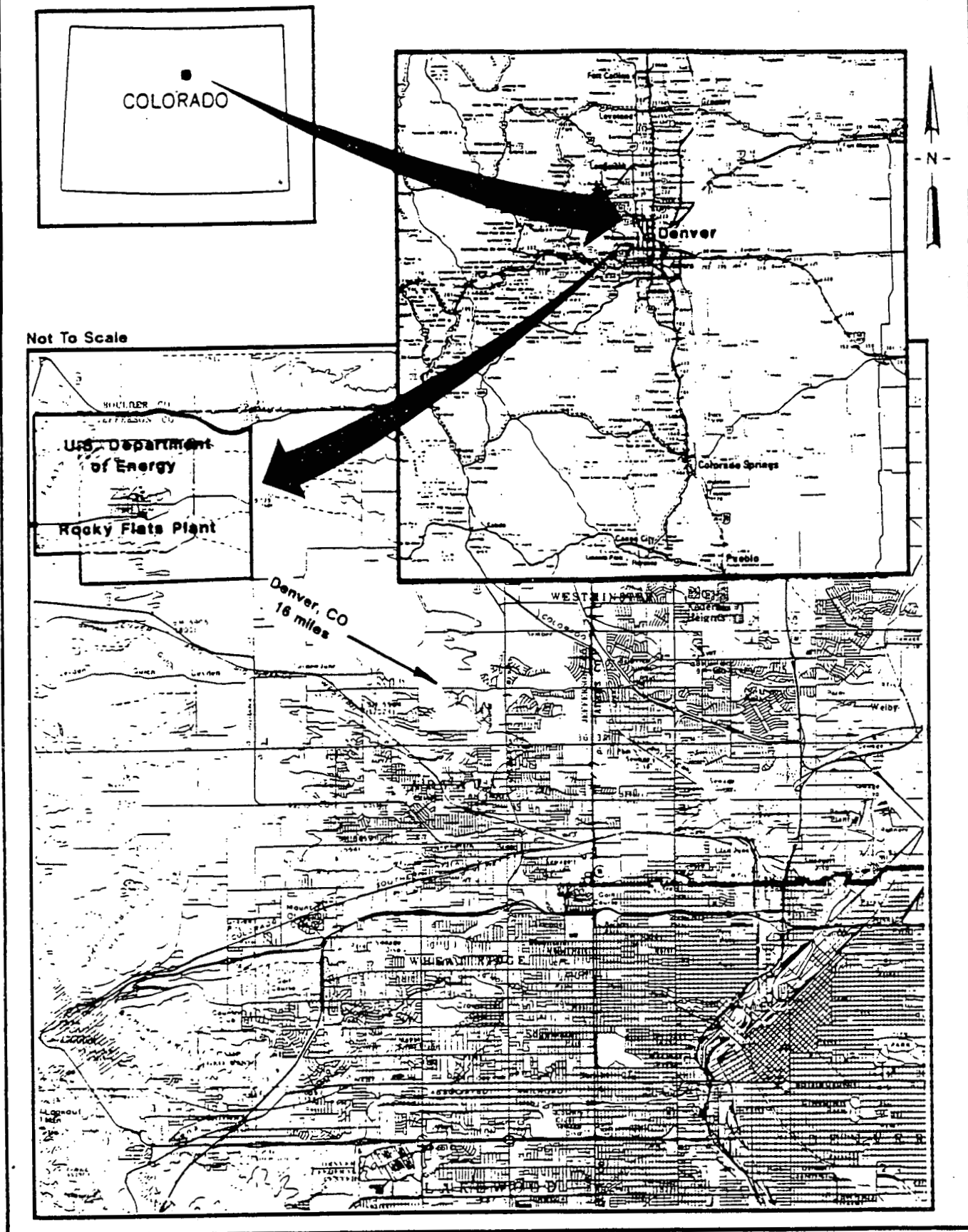
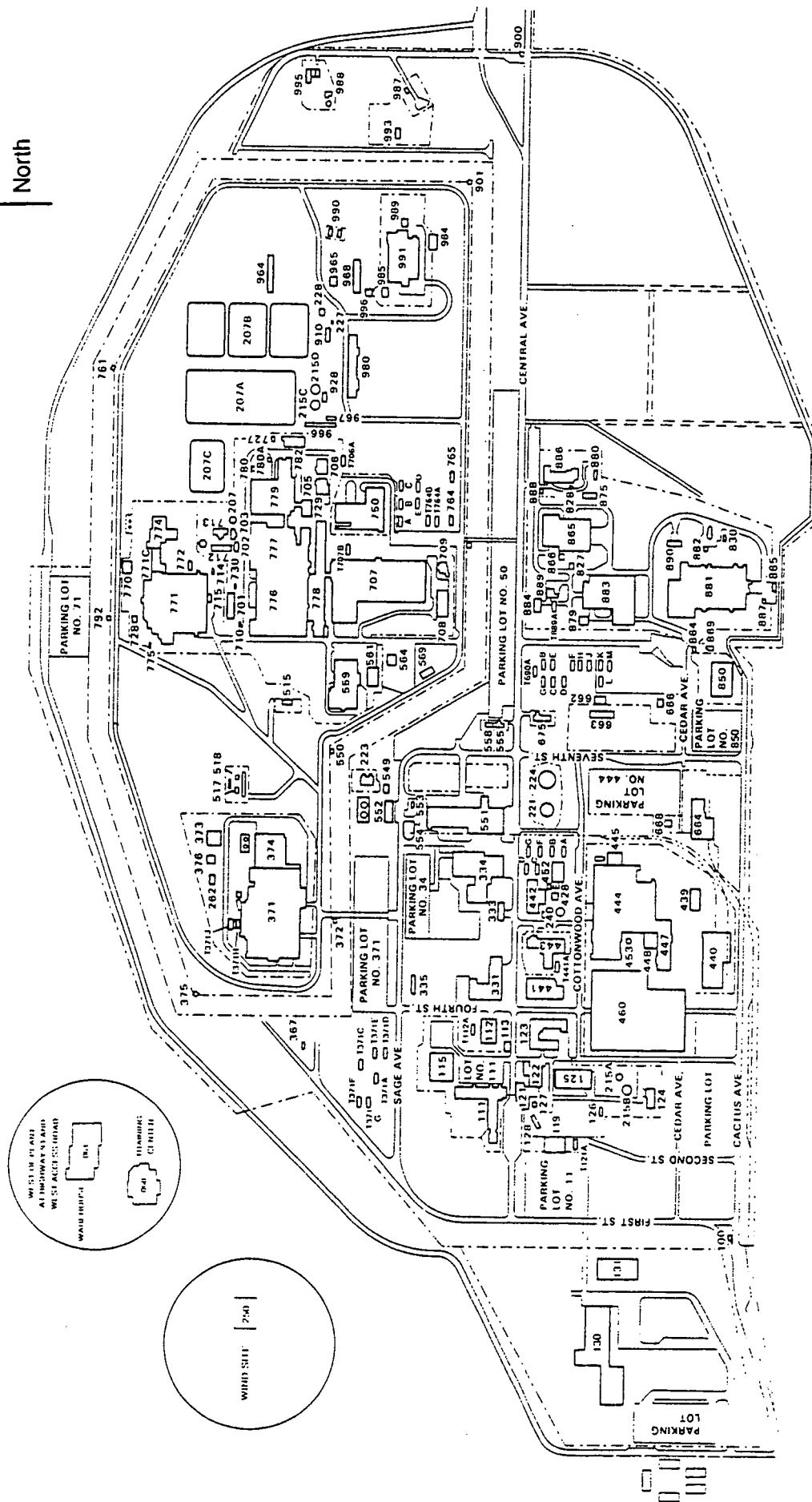


FIGURE 1-1

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CHAPTER 2 ORGANIZATIONAL STRUCTURE

2.1 Plant Organization

The Environmental Restoration Department (ER) at the RFP is under the direction of the Associate General Manager for Environmental Restoration and Waste Management (see Figure 2-1). ER Program Activities (CERCLA and RCRA response actions) involve the following ER Divisions:

- o Environmental Restoration Division (ERD)
- o Environmental Monitoring and Assessment Division (EMAD)
- o National Environmental Policy Act Division (NEPA)
- o Clean Water Action Division (CWAD)
- o Clean Air and Environmental Reporting (CAER)

(See Figure 2-2 for the organizational structure of the Environmental Restoration Department.)

The Health and Safety (H&S) Department at the RFP is under the direction of the Associate General Manager for Support Operations (see Figure 2-3). ER Program Activities involve the following health and safety divisions:

- o Radiological Operations
- o Occupational Safety
- o Health and Safety Area Engineering
- o Industrial Hygiene
- o Radiological Engineering
- o Occupational Health

Facilities Engineering (FE) and Facilities Project Management (FPM) also provide support to the ER program activities by implementing authorization projects (e.g., construction, excavation, equipment design, purchase and installation). FE's role is to provide engineering designs, oversight, and management of design projects. The Project Engineer (PE) from FE directs all project design activity, ensures the user's technical requirements are met, ensures conformance with plant design standards and obtains design concurrence from RFP technical support groups (e.g., Facilities Quality Engineering, Design Verification Engineering, Fire Protection Engineering, Plant Electrical and Plant Utilities Engineering, Operations, Maintenance and Utilities Management, etc.). FPM administers the implementation of engineering designs through Construction Management (CM). CM, a branch within FPM, is responsible for assisting ER with obtaining approval for work permits for land use and work activities, and for managing/coordinating general construction contractors and their quality of work. A Construction Coordinator, identified by CM, is responsible for coordinating with various departments within the RFP to obtain permits, escorts and access justification in addition to other supporting functions, as needed by Subcontractors.

Appendix D contains a list of RFP departments or divisions that are mentioned in this Plan. Phone numbers and contacts (when available) are also listed.

2.2 Responsibilities of Individuals

2.2.1 Division Managers

Environmental Restoration and Health & Safety division managers are responsible for supervising program and project managers in the implementation of ER and H&S activities.

2.2.2 Environmental Restoration Health and Safety Officer

The Environmental Restoration Health and Safety Officer (HSO) is responsible for managing and implementing the ER Health and Safety Program in concert with the Health & Safety Liaison Officer. Environmental Restoration will coordinate the implementation of the HSPP through the

Occupational Safety Division within the Health & Safety Department. Environmental Restoration is responsible for project planning, contracting, and managing; therefore, the ER HSO will oversee subcontractor health and safety activities and will coordinate all interactions among RFP health and safety groups.

2.2.3 Environmental Restoration Site Project Manager

The ER Site Project Manager is the direct line supervisor responsible for project work on a designated ER site. He/she reports directly to the ERD Manager. The ER Site Project Manager has overall control and responsibility for the management of the project, including health and safety. For authorization projects, the Project Manager is the single-point-of-contact for implementing ER's needs and requirements through the Project Administrator.

2.2.4 Health & Safety Liaison Officer

The H&S Liaison Officer is assigned from the Occupational Safety Division to the Environmental Restoration Division to serve as the central point-of-contact for supporting the ER Program for all operational health and safety needs. The H&S Liaison Officer reports to the Occupational Safety Division Manager and interacts directly with the ER Site Project Managers and the ER Health and Safety Officer. He/she also supervises the EG&G Site Health and Safety Coordinators. The H & S Liaison Officer has the following responsibilities:

- o Coordinates health and safety activities with the ER H&S Officer and the ER Site Project Managers
- o Implements the HSPP by providing and supervising EG&G Site Health and Safety Coordinators at each designated ER site
- o Prepares EG&G Health and Safety Plans (HSPs)
- o Coordinates approval of Site-specific (Task-Specific) Health and Safety Plans

prepared by Subcontractors and their lower-tier subcontractors with all health and safety disciplines

- o Performs periodic health and safety audits and inspections of the subcontractor health and safety programs, and program documentation
- o Enforces "Stop Work" orders (A Stop Work order is used when an unsafe working condition exists, a situation presents a serious or imminent danger to life or health, or a gross violation of procedures or rules has occurred.)

2.2.5 Site Health and Safety Coordinator

A Site Health and Safety Coordinator (SHSC) will be assigned from the Health and Safety Department to oversee Health and Safety Plan implementation for each Operable Unit, each phase of a workplan at an Operable Unit, or each ER remedial project work site within the Operable Unit, whether the work is performed by EG&G employees or EG&G subcontractors. The SHSC will report to the H&S Liaison Officer and will keep the ER Site Project Manager informed of health and safety related activities on the site. The SHSC has the following responsibilities:

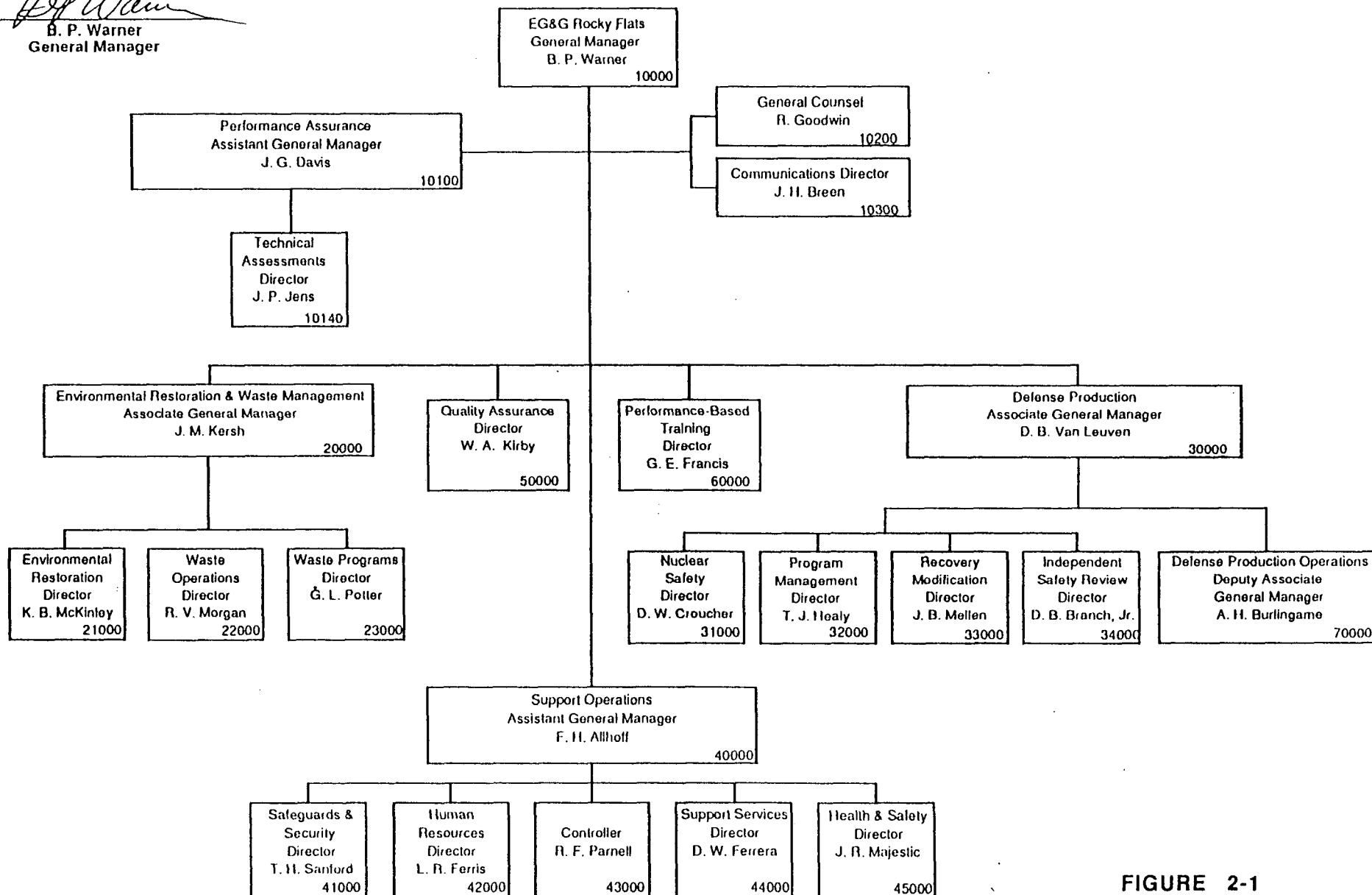
- o Oversees EG&G and subcontractor work to ensure that the requirements and principles of this HSPP and the HSPs are followed (The subcontractor's Site Health and Safety Coordinator shall be on site at all times.)
- o Performs periodic audits for proper and appropriate use of PPE, monitoring and decontamination procedures, access control and required documentation.
- o Alerts the ER Site Project Manager and the H&S Liaison Officer of health and safety violations at the ER remedial project work site
- o Enforces "Stop Work" orders

- o Approves modified work practices in response to health and safety violations at the ER remedial project work site when concurred with by the applicable Health & Safety Department Representatives
- o Coordinates with appropriate health and safety divisions to provide for radiation monitoring, medical surveillance, emergency response, industrial hygiene support and H&S engineering support (H&S Area Engineering will assist in obtaining, reviewing and completing Operational and Job Safety Analyses [OSA and JSA])
- o Provides on-site health and safety support at all times for tasks performed by EG&G employees beyond project management and oversight

oved:

B. P. Warner
B. P. Warner
General Manager

EG&G ROCKY FLATS



EG&G Rocky Flats
Chart 10000
April 9, 1990

FIGURE 2-1
EG&G ROCKY FLATS
Organization
DE-AC04-90DP62349

Approved:

K. B. McKinley, Director
Environmental Restoration

ENVIRONMENTAL RESTORATION

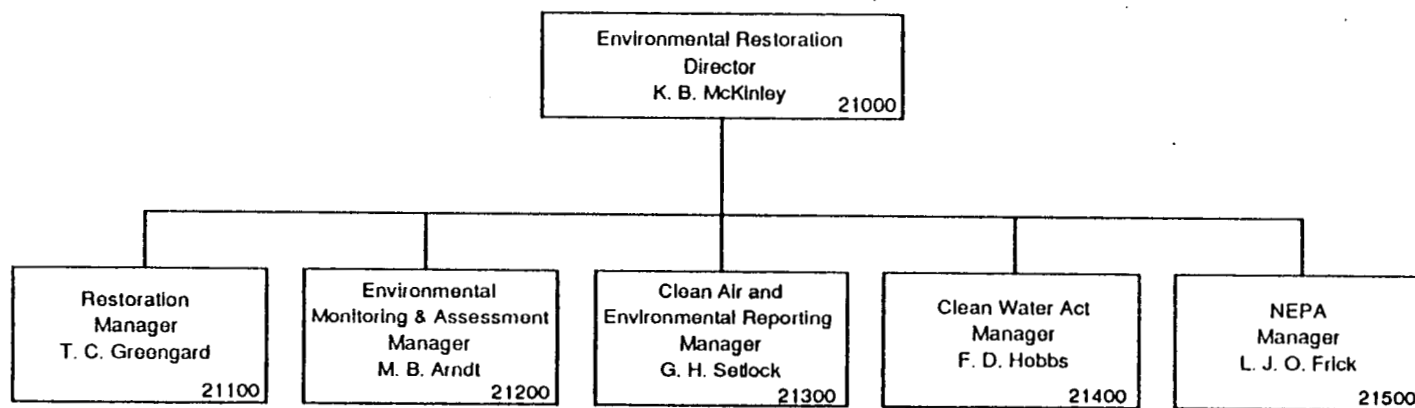


FIGURE 2-2

EG&G ROCKY FLATS
Organization

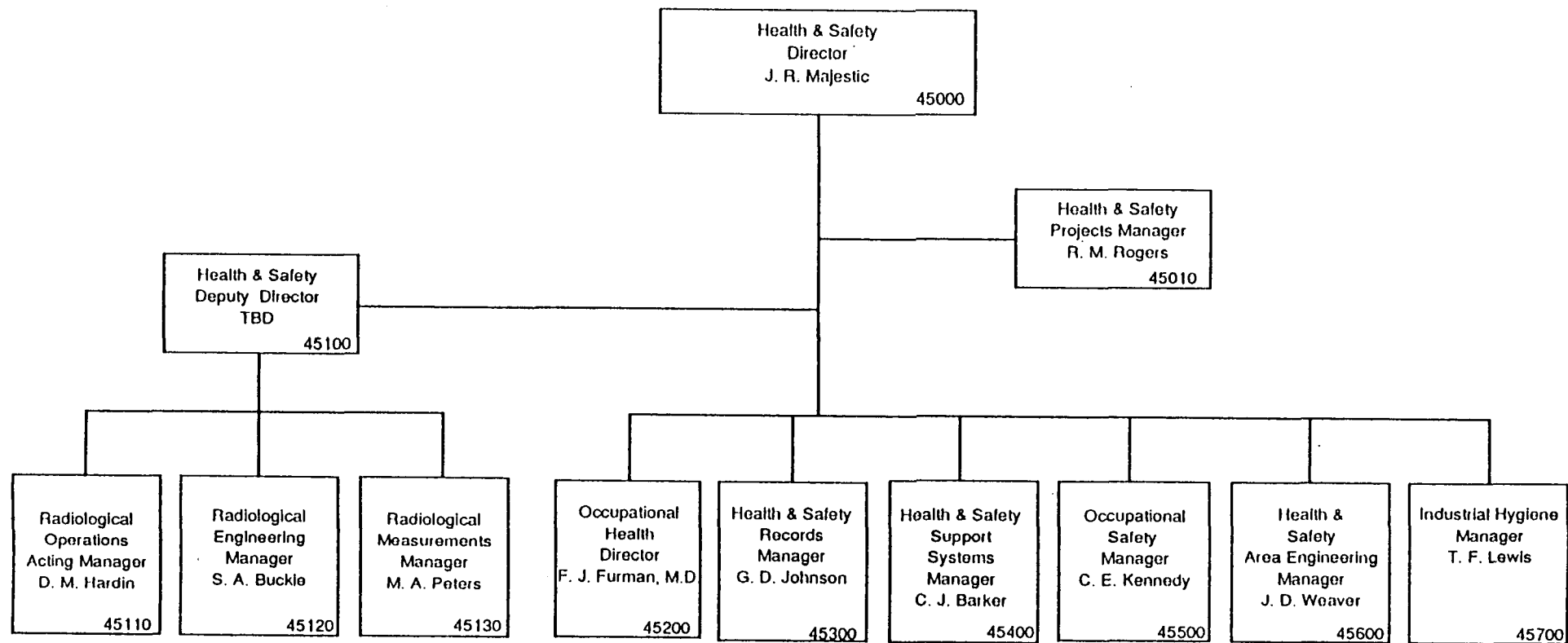
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Environmental Restoration
CHART 21000
April 9, 1990

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J. R. Majestic, Director
Health & Safety

HEALTH AND SAFETY



Health and Safety
CHART 45000
April 9, 1990

FIGURE 2-3
EG&G ROCKY FLATS
Organization
DE-AC04-90DP62349

CHAPTER 3

SITE HEALTH AND SAFETY PLANS

3.0 Overview

This section describes material that is to be incorporated into all Site Health and Safety Plans (subsequently referred to as the "Site Plan"), and explanations as to how the Site Plan is to be used. Section 3.1 describes the application of a Site Plan. Section 3.2 addresses the organizational responsibilities for development, preparation, approval, and implementation of the Plan and for follow-up and critique of its adequacy. Section 3.3 presents the components of the Plan. Section 3.4 describes the pre-entry briefing required of all site workers. Section 3.5 describes the procedures to be followed for conducting program audits used to verify the implementation and effectiveness of the plan. Section 3.6 describes the review and approval process for site plans.

A separate Site Health and Safety Workbook has been prepared to aid EG&G and subcontractor personnel in developing site plans. The workbook is provided for the convenience of individuals responsible for Site Plan development. Although every attempt has been made to include the descriptions and procedures required for each situation encountered in the field, circumstances will undoubtedly arise that are not covered in the workbook. The workbook is a guide that subcontractors may use to prepare site-specific health and safety plans. Subcontractors must meet or exceed the minimum requirements outlined in this document.

3.1 Application

A Site Plan is required for each project that falls under the scope of this program (i.e., operations meeting the requirements of 29 CFR 1910.120 (a)(1) as determined by the Environmental Restoration and Waste Management Department). EG&G will develop a Site Plan for each of the Environmental Restoration Operable Units. In addition, all subcontractors are required to develop a site specific Health & Safety Plan which meets the requirements of OSHA 1910.120 for their employees. EG&G Site Plans will be provided to subcontractors. Once

approved by EG&G, the elements of the Site Plan shall dictate the health and safety activities of all workers and visitors falling within its scope.

3.2 Organizational Responsibilities for the Plan

The responsibilities for the development, approval, and implementation of Site Health and Safety Plans are described in Chapter 2 (Organizational Structure) of this document.

3.3 Health & Safety Plan Components

The Site Plans used at Rocky Flats must address the following items as a minimum:

- o safety and health hazard assessment
- o a safety and health risk analysis for each site task and operation
- o key personnel assignments
- o employee training assignments
- o specified personal protective equipment per task
- o medical surveillance requirements
- o site control measures
- o personnel and site monitoring requirements
- o decontamination requirements and techniques
- o emergency response plans
- o confined space entry procedures, if applicable
- o spill containment contingencies
- o background of the project including scope of work, site history, anticipated duration of work, worker classifications, government agency involvement and approval documentation

The required elements of the Site Plan are described in detail in the EG&G Site Health and Safety Plan Workbook (Appendix A). Plans deficient in one or more of these elements will not be approved by EG&G.

Contractors may also be required to provide Operational Safety Analyses (OSAs) or Job Safety Analyses (JSAs) for tasks not covered by existing EG&G procedures. An OSA is a written safety procedure which outlines the safety hazards involved in an operation, methods of controlling those hazards, and the responsible personnel. A JSA is a safety analysis of a specific task not previously or routinely done. The Health and Safety Area Engineer will review the need for JSA and OSA development during the Site Plan review.

Standard Operating Procedures applicable to health and safety that have been prepared for environmental restoration activities include:

- o Rocky Flats Plant Access and Control 1.12
- o Personnel Decontamination 1.2
- o General Equipment Decontamination 1.3
- o Heavy Equipment Decontamination 1.14
- o Handling of Personnel Protective Equipment (PPE) 1.6
- o Handling of Decontamination Water and Wastewater 1.17
- o Field Communications 1.11
- o Field Radiological Measurements 1.16
- o Handling of PIDs and FIDs 1.15

Subcontractors are required to follow all ER SOPs when available.

3.4 Pre-entry Briefings

EG&G requires that visitors who are assigned tasks or allowed access to the exclusion zone and/or contamination reduction zone of a site and all site workers be advised of the contents of the appropriate Site Plan before entry is made. This is done in the form of a briefing given by the Site Health and Safety Coordinator. Each subcontractor SHSC will be responsible for providing this briefing to their site personnel. Each worker must read the entire plan before initiating work on site. This training and plan review will be documented and maintained in the employee's training records.

3.5 Program Audits

All Site Plans implemented at Rocky Flats are subject to inspection by DOE, EPA and/or EG&G designated officials. Such inspections may include, but are not limited to, the items described in Table 3-1. The intent of the audit process is to verify the implementation of the plan and to evaluate its effectiveness in protecting the health and safety of workers, visitors and the surrounding population. Site audits will typically be performed by the EG&G Site Health & Safety Coordinator.

3.6 Review and Approval

Review procedures for Site Plans developed for EG&G personnel and site-specific plans developed by Subcontractors, for tasks performed at the Rocky Flats Facility, will be similar. The major difference between the two review procedures will be the criteria for approval. Subcontractors, as a minimum, must meet all of the requirements of OSHA 1910.120, DOE orders, and Rocky Flats policies and any additional health and safety requirements identified in their contract. EG&G Site Plans must also meet the minimum requirements of OSHA 1910.120 and, in addition, must comply with all Rocky Flats Plant and DOE requirements. Approval of the Subcontractor Site Plan by EG&G will stipulate that the minimum requirements have been met. The Health and Safety Liaison Officer in conjunction with applicable divisions of the Health and

Safety Department (e.g., Industrial Hygiene, Radiological Engineering, Radiological Operations, Health and Safety Area Engineering; etc.) will approve Subcontractor Site Plans.

3.6.1 Subcontractor Health & Safety Plan Review

The Subcontractor is required to submit a site-specific health and safety plan to the Health and Safety Liaison Officer three weeks prior to the initiation of field work. Ten copies, identified as "DRAFT", must be submitted. The scope of the project will dictate how many people will review the Plan. The H & S Liaison Officer will distribute the Plan to at least six division representatives for review. These include Environmental Restoration, Radiological Operations, Industrial Hygiene, Radiological Engineering, Health and Safety Area Engineering and Occupational Safety. Other divisions may be required to review the Plan when appropriate. Reviewers will have approximately one week to identify deficiencies in the Plan. The Environmental Restoration Health and Safety Officer will consolidate comments and return the Plan to the Subcontractor for corrections. The Subcontractor will have about one week to make corrections and resubmit the Plan with the corrections documented (see Figure 3-1 for correction form). The ER H & S Officer and the H & S Liaison Officer will review changes and may resubmit the plan to the appropriate division(s) for additional review if changes are inadequate or unclear.

3.6.2 EG&G Health & Safety Plan Review

EG&G Site Plans will either be generated internally or will be subcontracted to an outside consultant. The generator of the Plan will be required to submit ten copies of the Site Plan to the Health & Safety Liaison Officer three weeks prior to the initiation of field work. The H & S Liaison Officer has the responsibility of informing subcontractors of the required deadlines for draft and final submittals. The H & S Liaison Officer will distribute the Plan for in-house review. Reviewing departments include Environmental Restoration, Radiological Operations, Industrial Hygiene, Radiological Engineering, Health and Safety Area Engineering, Occupational Safety, Occupational Health and the Fire Department. Other departments may be required to review the Plan when appropriate. Reviewers will have approximately one week to identify

deficiencies in the Plan. The Plan will then be returned to the generator for corrections. The generator will have about one week to make corrections and resubmit the plan with the corrections documented (see Figure 3-1 for correction form). The H & S Liaison Officer will review changes and may resubmit the Plan to the appropriate department(s) if changes are inadequate or unclear. The final approval shall be based on the requirements stipulated in this document. EG&G site specific health and safety plans will be approved by the Director of Environmental Restoration, the Director of Health and Safety, the Environmental Restoration Health and Safety Officer and the Health and Safety Liaison Officer (see Figure 3-2). In addition, the representatives of reviewing divisions will also sign off on the plan documenting that they "have reviewed the Plan and agree that requirements which are managed at the RFP by their respective division are believed to be technically correct" (see Figure 3-3).

TABLE 3-1

SITE HEALTH & SAFETY AUDIT

1. Is the written site plan on-site and available to workers?
Y N
2. Are training records available for each on-site worker?
Y N
3. Are medical fit-for-duty records available for site workers?
Y N
4. Is the air monitoring equipment designated in the site plan being used?
Y N
5. Is air monitoring equipment properly calibrated based on observation and calibration records as stipulated in the site plan?
Y N
6. Are air monitoring surveys conducted as described in the plan?
Y N
7. Have conditions and/or tasks changed significantly since the last site hazard analysis?
Y N
8. Are workers familiar with the personal protective equipment required for the tasks they are performing, its use and techniques for inspecting, donning, doffing and decontaminating prior to site entry based on observation?
Y N
9. Is the site properly posted and secured from unauthorized entry?
Y N
10. Are decontamination techniques properly performed and verified?
Y N
11. Are workers familiar with the emergency response plan and has it been rehearsed?
Y N

Table 3-1, continued

12. Are the appropriate levels of PPE being utilized as stipulated in the plan?
Y N
13. Are spill containment supplies available on-site, if called for in the site plan?
Y N
14. Are confined space entry protocols being followed based on observation?
Y N
15. Is the Work Permit properly filled out and posted?
Y N
16. Are workers capable of answering basic questions regarding the characteristics and hazards of the contaminants?
Y N
17. Are hazardous wastes associated with decontamination properly contained and labeled?
Y N
18. Do employees know where Material Safety Data Sheets (MSDS) are located in their work areas?
Y N

FIGURE 3-1: CORRECTION FORM

Reviewer: _____

Department: _____

Building Number: _____

Phone Number / Pager Number: _____

ORIGINAL STATEMENT (include page number,
section number, location in paragraph)

CORRECTION

FIGURE 3-2
ENVIRONMENTAL RESTORATION HEALTH & SAFETY PROGRAM PLAN
REVIEW AND APPROVAL

_____/_____
Director of Environmental Restoration Date

_____/_____
Director of Health & Safety Date

_____/_____
Health & Safety Liaison Officer Date

_____/_____
Environmental Restoration Health & Safety Officer Date

FIGURE 3-3
REVIEWING DEPARTMENTS APPROVAL FORM

The following signatures document that the respective departments have reviewed the Site Specific Health and Safety Plan and agree that requirements which are managed at the RFP by their departments are believed to be technically correct.

Environmental Restoration Representative

Date

Occupational Safety Representative

Date

Industrial Hygiene Representative

Date

Radiological Engineering Representative

Date

Radiological Operations Representative

Date

Health & Safety Area Engineering Representative

Date

Occupational Health Representative

Date

Fire Protection Representative

Date

ER Health and Safety Program Plan: Site-wide

Issue: DF

Date: August 13, 1990

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CHAPTER 4

TRAINING

4.0 Introduction

The purpose of the health and safety training program is to provide the knowledge and skills needed to safely perform required tasks in potentially hazardous environments, utilize protective equipment to prevent exposures or injury, and to anticipate, identify, and react to unplanned or potentially dangerous situations.

The training requirements established for workers at Rocky Flats vary based on the classification of the site, the workers' assigned task, the respiratory protection requirements for a project, and a workers' job classification. Section 4.1 describes the training requirements and course content for anticipated operations. Section 4.2 addresses the criteria for approved courses and methods of obtaining training. Section 4.3 describes EG&G methods of evaluating trainees' performance. Section 4.4 describes verification of worker training and Section 4.5 addresses documentation.

4.1 Training Requirements & Course Content

4.1.1 Hazardous Waste Site Health & Safety

Any individual who is assigned to work within an ER hazardous waste site, as defined by the scope of this document, must first complete a hazardous waste health and safety course. The course required may be a 24 hour or 40 hour program based on the type of site and the

workers' assigned task(s). The 40 hour course is mandatory for those workers who are required or may be required to use respiratory protective equipment on a hazardous waste site. The 40 hour course is defined in this manual as a Class I requirement. Workers who are assigned tasks on these sites, but work in level D without level C contingencies are required to have a minimum of 24 hours initial hazardous waste health and safety training. The 24 hour course is defined as a Class II requirement. Workers may have their training upgraded from Class II to Class I status by obtaining an additional 16 hours of training, provided it meets EG&G's requirements for level B & C PPE use.

Supervisors of hazardous waste sites or of tasks conducted on hazardous waste sites must have, as a minimum, the same baseline training (40 or 24 hours) as those workers being supervised plus an 8 hour advanced supervisor health and safety course.

All hazardous waste workers (Class I and II) must receive an 8 hour refresher course annually. Workers will not be permitted on site until the refresher training requirement is met.

Table 4-1 summarizes the initial hazardous waste health and safety training requirements. The EG&G Health & Safety Liaison Officer should be contacted for clarification of the level of training required of workers on specific projects.

As an example of the major issues covered in the EG&G 40 and 24 hour Hazardous Waste Workers H & S Course, a current outline of subjects covered in the courses is included in Table 4-2. The two courses are identical except that the 24 hour course does not include field exercises. The refresher course is an in-depth review of the 40 hour course material. Table 4-3 describes the content of the current EG&G supervisor course. Course outlines are included as examples of the subjects covered in these courses.

4.1.2 Basic Radiation Safety Training

All EG&G personnel and subcontractors working on ER remedial project sites will take the Radiation Safety course offered by the EG&G training department. The course is a Computer Based Training course (CBT) which is self-paced and takes approximately one hour to complete. Workers who are assigned to work in areas where radioactive materials are present will be required to take the two day Radiation Worker training course provided by EG&G.

4.1.3 ER Remedial Project Work Site-Specific Training

Workers on hazardous waste sites must receive site specific training based on the health and safety plan, unless such training was incorporated into the initial 24 or 40 hour hazardous waste health and safety training program. This training shall be coordinated through the ER Site Project Manager and reviewed and approved by the Health and Safety Department. The training will address all sections of the Site Plan in enough detail so that site personnel can safely perform their assigned tasks. Subcontractors must provide the same training to their employees. Subcontractor training programs will not be reviewed or approved by the EG&G Health and Safety Department.

4.1.4 Hazard Communication Training

Hazard communication training shall address the hazards associated with the commercial chemical products used on an ER site. This course is a Computer Based Training course which is self-paced and takes approximately one hour to complete. Table 4-4 describes the content of the EG&G hazard communication program. Subcontractors must cover the OSHA Hazard Communication training for site specific hazards in their site-specific training program.

4.1.5 Rehearsal of Emergency Response Plan

The requirements of OSHA 29 CFR 1910.120 requires periodic rehearsal of the Emergency Response Plan. The ER Health and Safety Officer shall coordinate these rehearsals, which shall be formally documented and used to evaluate the effectiveness of the Emergency Response Plan. The ER Health & Safety Coordinator will coordinate rehearsals with subcontractors so that both EG&G and subcontractors are prepared in the event of an emergency. An emergency response rehearsal will be held for each major ER site and will be coordinated to include all long-term subcontractors. Short-term subcontractors will receive a briefing detailing the specific requirements of the emergency response plan if they are not on site when rehearsals are held. Rehearsals shall be conducted at least annually.

4.1.6 Visitor Briefings

All visitors requiring access to an ER remedial work site shall have orientation prior to gaining access to the site. **The completion of this training does not allow the visitor into controlled areas of the ER site.** This training is designed to provide sufficient information on site hazards and utilized control measures at the ER remedial project site to prevent the visitor from violating any safety requirements. While at the ER remedial project work site, visitors shall be escorted by a trained worker or supervisor at all times.

The following sections of the ER site-specific training may be omitted from the visitor briefing:

- o Proper use of PPE (unless worn by visitors)
- o Medical surveillance requirements
- o Requirements for confined space entry

All visitors shall provide signature verification that they have read, understand, and shall comply with all requirements stated in this program and the applicable site plan for work sites they are visiting.

4.1.7 Tailgate Safety Meetings

Weekly "toolbox" or "tailgate" safety meetings shall be conducted by the Subcontractor Site Health and Safety Coordinator as required by EG&G Health and Safety Practices Manual, Chapter 2.01 (2.01 requires "frequent short meetings [e.g., weekly 10-minute "toolbox" safety meetings]"). The SHSC has the responsibility for providing these meetings and ensuring that minutes of the meeting are taken. The discussion at these meetings shall include:

- o health and safety considerations and necessary protective equipment for current operations,
- o any revisions to the Site Plan (EG&G or subcontractor),
- o any new MSDS forms filed on the ER remedial project work site,
- o all documented and/or observed unsafe acts committed on the ER remedial project work site since the previous meeting, a clarification of the safety requirements violated, and methods to prevent recurrence, and
- o other topics as specified in EG&G Health and Safety Practices Manual, Chapter 2.01 (on-the-job safety, area hazards, fire reporting and response, eye washes/safety showers, decontamination protocols, nuclear safety, etc.).

All workers are required to attend the meetings and sign an attendance sheet attached to the meeting minutes. Meeting minutes will be documented on RF-7060, Safety Summary Report,

contained in the EG&G Health and Safety Practices Manual. The SHSC shall follow up with absentees by reviewing the meeting minutes with them and having them sign the attendance sheet. The SHSC shall ensure that minutes and attached attendance sheets are completed and distributed to the ER Health and Safety Officer. Minutes of the meetings shall be retained on file at the ER remedial project work site and archived following project completion.

4.1.8 Additional Health & Safety Training Programs

EG&G provides a variety of specialized training programs for site workers which are dictated by the worker's specific assignment. Table 4-5 summarizes some of these courses.

4.2 Implementation of Training

Training for EG&G personnel is provided by the EG&G Training Department. Most training is conducted in-house with the assistance of various EG&G health, safety, and environmental groups. Some training is provided through agreements with academic organizations and subcontractors. The Manager of Plant General Employee Training serves as the point of contact for EG&G training course availability. The manager can be reached at 966-7706.

The training of subcontractors for work planned at Rocky Flats is the responsibility of the subcontractor. Training must meet the performance requirements of EG&G and OSHA. EG&G provides Computer Based Training (CBT) for subcontractor personnel covering specific topics. The following CBTs are available and may be required depending on the potential hazards at specific sites: Respirator Indoctrination (required before fit tests), Radiation Safety, Industrial Safety, Industrial Hygiene, Waste Minimization, Quality Assurance, Fire Protection, Security and Emergency Planning. Respirator fit tests will be provided by EG&G for all

subcontractor personnel who may be required to wear respirators while working on ER sites.

Industrial Hygiene is responsible for the respirator program. Coordinate fit tests through IH at 966-6627 or 966-6628.

4.3 Performance Evaluations

The training requirements, described in this chapter, are designed to teach skills and knowledge applicable to field work. The workers and supervisors are held accountable for learning and applying these basic skills and concepts. EG&G shall evaluate workers' abilities through the administration of tests in training courses and through field performance evaluations. The training department has established testing procedures and minimum score requirements for examinations given in training courses. The Site Health & Safety Coordinator shall conduct field audits to evaluate health & safety skills. The Health & Safety Liaison Officer will ensure that audits are done on a regular basis (unannounced, quarterly). Below average performance on examinations or field skill evaluations shall be reported to the employee's supervisor.

Retraining and subsequent demonstration of adequate skills may be required by the Liaison Officer.

4.4 Verification of Training

All EG&G personnel, agency representatives and subcontractors must obtain laminated badges documenting training for each assigned individual prior to beginning field work. Laminated badges will be provided by EG&G. Subcontractors can obtain the badges at Building 060.

Appointments can be scheduled by calling Plant General Employee Training at 966-6318. The laminated badges must be worn at all times when accessing or working in a location where the training is required.

4.5 Training Records

All health and safety training, conducted by EG&G, shall be documented as required by the EG&G Training Department. All training records for EG&G personnel will be maintained by the training department in accordance with 29 CFR 1910.120. Successful completion of the training specified in this section and documentation of completion by the SHSC, is required for all employees prior starting work at ER remedial sites. Signature verification is required to document that workers and supervisors have read, understood, and will comply with all requirements stated in the HSPP and H&SP applicable to the ER remedial project site.

Table 4-1
Training Requirements of 29 CFR 1910.120
and associated EG&G Training Classifications

<u>Population</u>	<u>Initial Training</u>	<u>Annual Refresher Training</u>	<u>Certification By Whom</u>
<u>Class I</u>			
<u>General Site Workers</u>			
Laborers	40 hrs off-site	8 hours	Instructor or head
Equipment Operators	3 days OJT		instructor and trained supervisor

qualified for level B, C, or D PPE use)

<u>Class I-S</u>			
<u>Supervisors</u>			
	40 Hrs off-site	8 hours	Instructor or head
	3 days OJT		instructor and trained supervisor
	8 hrs advanced		

(Directly responsible for work performed by Class I workers)

<u>Class II</u>			
<u>Hazardous Waste Site Workers with Limited Exposure</u>			
	24 hrs off-site	8 hours	Instructor or head
	1 day OJT		instructor and trained supervisor

- . Limited Tasks
- . Unlikely to be exposed above PEL
- . No Respirators
- . No Emergencies
- . Site fully characterized

<u>Class II-S</u>			
<u>Supervisors</u>			
	24 hrs off-site	8 hours	Instructor or head
	1 day OJT		instructor and trained supervisor
	8 hours advanced		

(Directly responsible for work performed by Class II workers)

Emergency Response	May be included in training listed above; prior to responding to emergencies	8 hours	Instructor or head instructor and trained supervisor
--------------------	--	---------	--

* Employers who can show by documentation or certification that an employee's work experience and/or training has resulted in equivalent training do not need to provide initial training to such employee. Documentation of "OJT (On-the-Job Training)" is still required.

Table 4-2
EG&G HAZARDOUS WASTE WORKERS
HEALTH AND SAFETY COURSE CONTENT

Module 1:	Description of Lessons and Instructional Objectives
Module 2:	Introduction
Module 3:	Review of Regulations
Module 4:	Definitions
Module 5:	Sources of Hazard Information
Module 6:	Hazards in the Work Environment
	Section 1: Chemical Hazards
	Section 2: Compressed Gases
	Section 3: Ionizing Radiation
	Section 4: Heat Stress
	Section 5: Cold Stress
	Section 6: Confined Space
	Section 7: Safety Hazards
	Section 8: Noise
Module 7:	Generic Site Safety Plan
Module 8:	Incident Command
Module 9:	Medical Surveillance
Module 10:	Toxicology
Module 11:	Site Control, Characterization and Monitoring
Module 12:	Personal Protective Equipment
Module 13:	PH Acid/Bases
Module 14:	Decontamination

Module 15: Spill Response

Module 16: Level C & B Exercises¹

¹The 24 hour course does not include Level C or B Exercises

Table 4-3

SUPERVISOR TRAINING COURSE OUTLINE

Manager and Supervisor Responsibilities

1. Worker 24 Hour On-The-Job Training
2. Work Site Characterization
3. Pre-emergency Planning
4. Selection of Proper PPE
5. SARA Title III
6. Legal Aspects of Supervision
7. Potential Problem Analysis
8. Remedial Action - Lessons Learned

Table 4-4

HAZARD COMMUNICATION TRAINING COURSE OUTLINE

Course Content:

- o OSHA, DOE, and Rocky Flats standards and policies on hazard communication
- o Hazardous material evaluation responsibilities
- o The warning labels used at Rocky Flats
- o Material Safety Data Sheets (MSDS)
- o How to obtain hazard information

Course objectives are to train the employee to:

- o describe the OSHA, DOE and Rocky Flats Hazard Communication policies,
- o identify the agencies responsible for hazardous material evaluation,
- o interpret a Rocky Flats warning label,
- o describe the contents and uses of MSDS, and
- o list several different sources from which to obtain hazard information.

FIGURE 4-5

GENERAL TRAINING PROGRAMS

<u>COURSE NAME</u>	<u>CURRICULUM</u>	<u>COURSE NUMBER</u>	<u>FREQUENCY</u>
Respirator Certification	056	284	Annually
Beryllium Operations	056	286	Biannually
Industrial Safety	023	429	One Time
RCRA Classroom	023	435	Annually
RCRA On-The-Job-Training	018	442	Annually
Radiation Safety	023	476	Biannually
TRU Waste	023	592	Biannually
Low-Level Waste	023	692	Biannually
Com Sec Officer	079	594	Biannually
Com Sec User	079	595	Biannually
Nuclear Materials Safeguards	038	597	Biannually

CHAPTER 5

MEDICAL SURVEILLANCE

5.0 Introduction

The Medical Department, under the direction of the Occupational Health Director, is responsible for the Rocky Flats Plant Medical Surveillance Program. The Medical Surveillance Program is designed to detect early signs of adverse health effects from chemical, radiological and physical hazards on the Rocky Flats Plant site and to facilitate protective measures. Qualified occupational medicine physicians conduct the medical surveillance program.

The Medical Department provides, at no cost to the employee and without loss of pay, comprehensive physical examinations to all EG&G employees. The exams are used to assess the health status and physical fitness of employees and to ensure work assignments do not exceed employee's physical capabilities.

OSHA medical surveillance requirements detailed in the Hazardous Waste Operations and Emergency Response Standards [29 CFR 1910.120 (f)] provide the framework for a medical monitoring program for hazardous waste site workers. The standard includes provisions for baseline, periodic, and termination medical examinations to document potential exposures. The standard requires that the following employees be covered: employees who may be exposed to hazardous substances at or above the permissible exposure limit or published exposure limit for 30 days or more per year; employees who wear respirators for more than 30 days per year; and employees who develop symptoms of overexposure. Because of the potential hazards associated with environmental restoration projects, all EG&G site personnel will be required to participate in a medical surveillance program.

5.1 Subcontractor Medical Surveillance Program

Subcontractors are responsible for providing and implementing a medical surveillance program for all of their personnel participating in remedial project work at the Rocky Flats Plant who

meet the requirements of 1910.120(f)(2) identified in Section 5.0.

Subcontractors working at environmental restoration sites will be provided with a copy of the EG&G Site Plan for the Operable Unit in which they will be working. Chemical and radiological hazards that have been identified at the site will be discussed in the Hazard Assessment section of the Site Plan. This document will be the best source of information for identifying potential site contaminants but will only be as comprehensive as the investigative studies that have been done. In some instances, only minimal data will be available or the subcontractor may be contracted to assess the hazards of the site. The available information should be provided to the consulting physician so that they fully understand the scope of work and the extent of the investigations on which the hazard assessment is based.

Subcontractors meeting the requirements of 1910.120(f)(2) will be required to have baseline physical examinations prior to working on the site. The baseline examination must be current, i.e., within the last twelve months, and must include appropriate baseline bioassays.

Subcontractors are required to maintain copies of "fit-for-duty" records, signed by the consulting physician, for all personnel participating in the medical surveillance program. The records must be kept on plant site and be available for audit by RFP personnel. In addition, the physician must document that the employee is medically qualified to wear a respirator if respiratory protection is required.

5.2 EG&G Medical Surveillance Program

EG&G personnel assigned to work at Environmental Restoration Sites will be identified to the Medical Department by their supervisor. In addition, a copy of the hazard assessment from the EG&G Site Plan, for the site to which they are assigned, will be provided to the Medical Department. Based on environmental, industrial hygiene and radiological sampling data, description of tasks, and historical RFP data, the Medical Department will use their expertise to determine how the standard RFP medical examination will be augmented, if necessary, to cover the hazards of concern. Workers assigned to the same site will receive individual, specific examinations based on potential exposures and personal health.

The content of the medical examination will be determined by the Occupational Health Director or in certain situations by a private attending physician and may include the following elements:

- o Completion by the employee of the "Medical and Occupational History Form" (RF-46498).
- o Annual "At-risk" physical examination
- o Chest x-ray (as required)
- o Pulmonary function test (FEV/FVC)
- o Electrocardiogram (EKG)
- o Complete blood count with differential
- o SMAC 23
- o Urinalysis (dipstick and microscopic)
- o Visual acuity
- o Slit lamp examination
- o Audiogram

Additionally, the examining physician will provide a written opinion of the employee's ability and fitness to perform the required job task(s) and wear a respirator. The physician will take into consideration:

- o temperature extremes that may be encountered as a result of environmental conditions and/or wearing protective clothing,
- o physical exertion, and
- o respirator usage.

The examining physician's opinion will be provided on Hazardous Waste Operations Form RF-47322. (See Figure 5-1).

The content of the follow-up examination and employee termination examination will include at least those items included in the baseline examination. This will allow the physician to make comparisons to previous data, possibly detect early signs of adverse health effects and facilitate protective measures. The attending physician may add to the testing and/or examination as he sees fit.

5.2.1 Frequency of Medical Examinations

EG&G employees assigned to work in or around a facility or site classified by EG&G as a RI/FS site or restoration site will undergo a baseline medical examination prior to initiating on-site activities. Employees will have a follow-up medical examination at least once each year and at termination of employment or reassignment (if the potential for exposure to hazardous substances is reduced) if the employee has not had an examination within the last six months. The Occupational Health Director may elect to have examinations, consultations, and/or testing (medical surveillance) conducted on a more frequent basis. EG&G employees will be given another physical examination by the Medical Department if:

- o they are suspected of having an overexposure to chemicals used on site,
- o they develop a lost-time illness of 5 working days or more,
- o they sustain a lost-time injury, or
- o they receive a CEDE greater than 5 rem.

The re-examination requirements shall be specified by the Occupational Health Director. The Medical Department shall document that the employee is fit to return to work or specify any activity restrictions as outlined in EG&G Health & Safety Practices Manual, Procedure 4.03.

5.2.2 Availability of Service

The Medical Department is located in Building 122. The full staff is on duty from 7:30 a.m. to 4:00 p.m., Monday through Friday. The registered nursing (R.N.) staff is available from 6:30 a.m. to 10:00 p.m., Monday through Friday. A physician and a nurse are always on call, for any emergency, during off hours. Weekend coverage (Friday 10:00 p.m. through Monday 6:30 a.m.) is provided by emergency medical technicians (EMTs). They can be contacted at Extension 4336 and will meet employees in the Medical Department or respond to the site of any emergency. Medical assistance will be provided to subcontractors by EG&G in the event of an emergency.

5.2.3 Transportation for Medical Reasons

EG&G will provide transportation for employees (if it is medically safe as determined by the Medical Staff) either to their home or to an appropriate medical facility for:

- o emergency: medical/EMTs will determine the appropriate mode of transportation for illness/injury requiring air or ground ambulance transport, or
- o non-emergency: if ambulance transport is not required, supervisors will be asked to arrange transportation.

In an incident where an employee is injured and requires non-ambulance transport to an off-site medical facility, the supervisor or designee shall accompany that person, as a representative of the company, and will be available to interface with outside authorities (if necessary) and to provide further transportation for the employee as appropriate. Supervisors unable to arrange transportation on weekends or during night work, should contact the RFP Shift Superintendent (Emergency Coordinator) for assistance. Ambulance service will be provided to subcontractors by EG&G in the event of an emergency.

5.2.4 Medical Restrictions

The Medical Department has the responsibility of assisting management in ensuring the placement of employees in work situations that will not create undue hazard(s) to the individual(s), co-workers, plant facilities, plant site environments, the public, and the general environment. The Medical Department is also responsible for applying preventive medical measures toward the maintenance of good physical and mental health of employees.

5.2.5 Supervisor's Responsibility

The supervisor has several responsibilities pertaining to medical surveillance. Some of these responsibilities are:

- o confirming, through the Medical Department, that employees are fit and do not have restrictions that will interfere with their job performance,
- o recognizing signs or symptoms of over-exposure to chemicals or heat stress (Information pertaining to recognition of such signs or symptoms is acquired through the OSHA Health and Safety Supervisor training.),
- o sending employees to the Medical Department for a work restriction re-evaluation if there has been a change in the employee's physical or mental condition, and
- o consulting personnel files regarding employee restrictions prior to placing the employee in a new position.

5.2.6 Employee's Responsibility

Medical surveillance is also the responsibility of each employee. Employees have responsibilities similar to the supervisors in this area; some of these responsibilities are:

- o advising their supervisors of any physical or mental conditions which could affect work performance,
- o recognizing some of the easily detectable signs or symptoms of over-exposure to chemicals or heat stress (Information pertaining to recognition of such signs or symptoms is acquired through the OSHA 40 hour Health and Safety training course and during site specific training.),
- o reporting all occupational injuries or illnesses immediately,
- o reporting to Medical to have limitations verified or restrictions imposed (Restrictions recommended by an off-site physician must be presented in writing to the Medical Department.), and
- o reporting to the Medical Department for re-evaluation as scheduled.

5.2.7 Work Assignments

A worker may be temporarily or permanently reassigned based on their mental or physical condition. The Medical Department will perform an assessment, communicate the need for a medical restriction to appropriate persons, and provide follow-up evaluations on the restriction status (The Human Resources Department determines pay status for restricted employees.).

5.2.8 Medical Records

All medical information will be included in the individual's file including laboratory reports, EKG reports, X-ray reports, health histories, physical examinations, and letters/reports from employee's personal or referral physician.

Medical and exposure monitoring records shall be maintained by the Medical Department in accordance with the requirements of 29 CFR 1910.20 "Access to Employee Exposure and Medical Records" and EG&G Health & Safety Practices Manual, Procedure 4.05.

Medical surveillance records at ER remedial project work sites shall be retained on site in a "Confidential Employee Training and Medical Certification File". These records include:

- o Medical Surveillance Information Sheet (Figure 5-2)
- o The "Physician's Written Opinion"

Subcontractors will maintain medical Fit-for-Duty documentation on site for their personnel.

FIGURE 5-1
OCCUPATIONAL HEALTH DEPARTMENT
ROCKY FLATS PLANT

MEDICAL SURVEILLANCE PROGRAM
HAZARDOUS WASTE OPERATIONS

PHYSICIAN'S CHECKLIST AND WRITTEN OPINION

EMPLOYEE NAME:	WORK AREA:
SSN:	JOB:

PART A - PHYSICIAN'S CHECKLIST				
		YES	NO	NOT APPLICABLE
1.	A medical and work history with specific emphasis related to the handling of this substance and health hazards, and to the fitness for duty including the ability to wear any required Personal Protective Equipment under conditions (i.e., temperature extremes) that may be expected at the work site.			
2.	A copy of the OSHA <u>Hazardous Waste Operations and Emergency Response, CFR 1910.120.</u>			
3.	A description of the employee's duties as they relate to the employee's exposure.			
4.	The employee's representative or anticipated exposure level.			
5.	A description of any personal protective and respiratory equipment used or to be used.			
6.	Information from previous medical examinations that is not otherwise available to me i.e., medical records obtained from employment having a positive history of exposure. This employee's written consent was required to obtain these medical records.			

PART B - PHYSICIAN'S WRITTEN OPINION (PWO)		YES	NO
1.	Are there any detected medical conditions that would place this employee at an increased risk of material health impairment from work in hazardous waste operations or emergency response, or from respirator use?		
If YES, please list the conditions, e.g. shortness of breath:			

c.	_____		
d.	_____		
e.	_____		

		YES	NO
2.	Are there recommended limitations on the employee or on the use of personal protective equipment such as respirators?		
If YES, please list the limitations and if temporary or permanent:			
	LIMITATION/RESTRICTION	TEMPORARY	PERMANENT
a.	_____		
b.	_____		
c.	_____		
d.	_____		

		YES	NO
3.	The employee has been informed by me of the results of this medical examination and any medical conditions that may require further examination and treatment.		
		YES	NO
4.	This employee has been provided with a copy of this PWO? If YES, the date employee was provided with PWO: / /		

EMPLOYEE SIGNATURE:		DATE:
PHYSICIAN	SIGNATURE:	DATE:
	PRINT NAME	

or, do not reveal specific findings or diagnosis unrelated to occupational exposure.

Distribution: Original: Employee's File
Copy 1: Employee
Copy 2: Control Building

FIGURE 5-2
MEDICAL SURVEILLANCE INFORMATION SHEET

Employee Name Title SSN
Operable Unit _____ Phase _____

Describe the employee's duties as they relate to the exposures at the ER remedial project site:

Detail the estimated exposure levels anticipated for this employee at this ER remedial project site:

Describe the Personal Protective Equipment (PPE) that this employee is anticipated using at this ER remedial project site:

CHAPTER 6

HAZARD EVALUATION

6.0 OVERVIEW

A hazard assessment must be completed for each task performed at environmental restoration sites prior to the initiation of field work. The assessment will identify chemical, radiological and biological hazards by evaluating existing monitoring data. Toxicological references will be utilized to further evaluate the associated risks of known contaminants. Based on these assessments, engineering controls and action levels for respiratory and personal protective equipment will be developed to maintain hazardous chemical and radiological exposures As Low As Reasonably Achievable (ALARA) and below OSHA Permissible Exposure Limits (PELs) or published exposure limits during field operations.

This section discusses basic hazards associated with Environmental Restoration work at the Rocky Flats Plant. Chemical and physical hazards are addressed in general terms due to the varied activities covered under the Plan. In addition, sources of information available at the Rocky Flats Plant, which can be utilized by Subcontractors and EG&G personnel, will be identified (e.g., where to obtain soil, water or air quality data, industrial hygiene monitoring data, and radiation monitoring and survey data).

The hazards associated with work on an environmental restoration site can be assessed by reviewing existing data and conducting on-site assessments during field operations. Existing chemical and radiological data sources include EG&G documents, environmental monitoring data, historical process data, and waste stream characterizations.

This Section describes sources of information available at the RFP and off site, and the types of data available from these sources. It further describes the roles that key departments play in providing site hazard information needed to characterize the risks at Operable Units.

6.1 Sources of Existing Information

The **Occupational Safety Department** will write a health and safety plan for each ER Operable Unit listed in Table 5 of the IAG (Appendix B). This document will identify the general hazards anticipated within each unit by extracting data from the existing sources. This Operable Unit Site Plan will be available to subcontractors for their task-specific hazard assessments.

The **Industrial Hygiene Department** maintains monitoring data related to employee exposures to chemicals. Summaries of applicable IH monitoring data, if available, will be included in the hazard assessment section of the site plan. Industrial Hygiene will develop the chemical monitoring requirements for the Operable Unit Health and Safety Plans.

The **Environmental Monitoring and Assessment Division of the Environmental Restoration Department** manages a database containing the analytical results of ground water, surface water, soil, and air samples. The database includes chemical and radiological information. Data can be retrieved for an area of the Rocky Flats Plant or for a specific ground water monitoring well, soil boring, or sampling location. The data can also be sorted to generate results from a certain time period, or background and historical data can be retrieved. The department also maintains published documents summarizing specific sites.

Historical processes and/or waste streams should be identified during the hazard evaluation for ER work at production or waste disposal locations. The Operations Department and the process manuals that detail their work can provide information concerning the raw materials used and

the intermediates and end products generated at a site. The Waste Operations Department coordinates waste disposal activities at the Plant. They document waste stream composition to ensure compliance with disposal regulations. The data available from these departments were not collected for evaluation of human exposures, but can provide information on the bulk composition of materials present at a site.

The **Environmental Management Department** keeps records of site-wide effluent monitoring. Site Environmental Reports are published monthly and annually by the Department. Contact the Clean Water Act Division (CWAD) for these reports which describe chemical and radiological effluent monitoring activities, summarize the monitoring results, and demonstrate compliance with environmental regulations.

Radiological monitoring data from specific buildings or areas of the Plant may be available from the **Radiological Engineering Department, Records Branch**. The Radiological Engineering and Radiological Operations Departments share responsibility for monitoring of employees for potential exposures to radiological constituents. Generally, **Radiological Engineering** develops monitoring programs which are implemented by **Radiological Operations**.

Many references are available to aid in evaluating risks from chemical and radiological exposures. Phone numbers for the divisions discussed in this section are included in Appendix D. The Site Health Safety Plan Workbook contains chemical data sheets for many contaminants. Appendix C of this document includes a list of toxicological references.

6.2 Chemical Hazards

Potential chemical contaminants at ER sites identified in the IAG include organic solvents, hydrocarbon fuels, heavy metals, corrosives, peroxides, toxic gases and flammables. An oil sludge pit, chemical burial area, liquid dumping area, an oil leak, solvent spills, drum storage area, reactive metal destruction area, gas detoxification area, hazardous waste storage area, waste spills, caustic/acid spills, chemical storage, waste peroxide drum burial, solvent burning ground and a hydrogen peroxide spill, are examples of ER sites where these types of compounds may be found. This plan covers environmental assessment and restoration work which continues to change as progress towards cleaning up the site is made and as technology improves. Therefore specific chemical hazards found at each site will not be discussed in detail.

Organic solvents that have been identified in some locations include trichloroethane, benzene, carbon tetrachloride, perchloroethylene, trichloroethylene, methylene chloride, acetone, dichloroethane, chloroform, and toluene. Several of these organic solvents are flammable and most are toxic in varying degrees. The most likely routes of exposure for volatile organics are inhalation and skin absorption. Many of the identified organic compounds are chlorinated, which typically affect the central nervous system, the cardiovascular system, the respiratory system, the kidneys, and the liver. Effects of exposure to these solvents can range from light-headedness to death depending on the magnitude of exposure. Further, direct or prolonged skin exposure can result in dermatitis and fissuring which can increase a worker's susceptibility to infection.

The primary constituents of concern in fuel products include benzene, toluene, and xylenes. Of these three aromatic chemicals, benzene has the lowest permissible exposure limit and is a known carcinogen. Therefore, benzene monitoring should be conducted when fuel products are

potentially present. Further, monitoring data documenting the presence of these compounds can be used to indicate fuel leak or spill locations.

Heavy metals have also been identified on many of the sites covered under this plan. The primary routes of exposure for metals are inhalation and ingestion, which can be toxic if taken in sufficient doses. Toxicity of specific metals range from acute symptoms (e.g., chromium compounds) to carcinogenicity (e.g., cadmium, arsenic and nickel). Metals identified at ER sites include aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, silver, sodium, vanadium, and zinc.

Exposure to caustics and acids generally cause acute effects rather than long term effects. Obvious symptoms of exposure to corrosives include eye, skin and respiratory tract irritation and burns. When acids and caustics are mixed, highly toxic gases (including chlorine and hydrogen chloride) can be generated.

Small concentrations of peroxides have been identified in a spill location and in a drum burial site. Peroxides are oxidizers and can be explosive hazards depending on concentration and ambient conditions. Many are sensitive to heat, impact, friction or other chemical compounds such as acids, mixtures of alcohols and acids, and metals. They can also cause ignition of organic material (e.g., acetone or cotton).

Toxic gases may be present at many sites as a result of volatilization, off-gassing, container ruptures, and decomposition. Some of the more toxic gases that could be present include chlorine, hydrogen chloride, carbon monoxide, sulfur dioxide, hydrogen cyanide, ammonia, and hydrogen sulfide.

6.3 Radiological Hazards

Radioactive isotopes, used or generated at the Rocky Flats Plant, that may be detected at Environmental Restoration sites include: plutonium, uranium, americium, cesium, strontium, and tritium. ER worksites that have been identified as radiologically contaminated include the Solar Evaporation Ponds, drum storage areas, hazardous waste storage areas, original uranium chip roaster area, radioactive liquid waste storage tanks, waste spill sites, cooling tower ponds, and a former radioactive soil burial site. In addition, some soil, ground water and surface water investigation areas contain radiological components.

The risks associated with overexposure to ionizing radiation vary with the dose, route of exposure, and the type of radiation. Acute (high, short term) exposure from working at Environmental Restoration sites is not a realistic hazard. Chronic (low level, long term) exposures could occur. Uncontrolled, chronic exposures above background may contribute to increased risk of cancer. Relatively high levels of exposure may increase the risk of birth defects. Uncontrolled elevated exposures have also been associated with life shortening and chromosomal damage.

6.4 Monitoring Program

A program to monitor ER site workers shall be implemented during the initial hazard assessment. The objectives of the monitoring program are to ensure adequate protection of workers and compliance with applicable regulations. Also, real-time monitoring data, along with field observations, can indicate whether a sampling and analysis plan should be modified. The program should include monitoring for contaminants of concern identified during the initial hazard assessment or from historical data. Because personnel exposures have not been documented for the specific ER tasks and comprehensive data may not be available to assess

hazards for all the sites, the monitoring program should begin with a broad scope and be adjusted as results are reviewed. Integrated sampling will be done to obtain 8-hour time-weighted averages and short term exposure data. Industrial Hygiene will determine which constituents to evaluate based on the toxicity of the material, exposure routes, and concentration in the medium of concern. Integrated sampling will be combined with real-time monitoring to further characterize potential exposures. General information concerning typical real-time monitoring equipment is presented below.

Monitoring for organic and inorganic parameters can be conducted using a variety of portable instruments. Instruments such as a flame ionization detector (FID, e.g. the Foxboro Organic Vapor Analyzer) or a photoionization detector (PID, e.g., the hNu) measure the concentration of total organic compounds in the air. PID instruments can also detect some inorganic compounds such as ammonia and hydrogen sulfide, however, the instrument sensitivity for these compounds is low. A portable gas chromatograph (GC) can be employed to identify specific organics that may present. GCs can be used for both quantitative (amount) and qualitative (specific compound) analyses. Detector tubes are available to monitor inorganic and organic compounds including hydrogen cyanide, hydrogen sulfide, mercury, acetone, trichloroethylene, and many others. Specific meters can be used to monitor inorganic compounds such as hydrogen sulfide, carbon monoxide, and hydrogen cyanide.

A combustible gas meter should be used to monitor explosive or flammable hazards. Oxygen levels should be monitored with oxygen (O_2) meters. Explosion hazards are typical of investigations involving fuel products or fuel storage units. Environments with low oxygen content may be encountered during activities in confined spaces.

Instruments such as Geiger-Mueller survey meters, FIDLER monitors, proportional detectors such as air ionization detectors and scintillometers are used to measure radiation. These

instruments detect different types of radiation, e.g., alpha, beta, gamma, etc., and can indicate when action levels are approached or contamination is present.

6.5 Heat Stress

Workers assigned to tasks which require the use of personal protective equipment are at risk of developing heat stress when ambient temperatures exceed 70 °F. Impermeable clothing limits the body's normal heat exchange mechanisms and increases energy expenditure. Heat stress can cause health effects which range from heat fatigue to serious illness or death. Signs and symptoms of heat stress include:

- o HEAT RASH that results from continuous exposure to heat or humid air;
- o HEAT CRAMPS that are caused by heavy sweating with inadequate electrolyte replacement (Signs and symptoms include muscle spasms and pain in the hands, feet and abdomen.);
- o HEAT EXHAUSTION that occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular inefficiency or dehydration. Signs and symptoms include pale, cool, moist skin; heavy sweating; dizziness; nausea; and fainting; and
- o HEAT STROKE which is the most serious form of heat stress (Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Medical help must be obtained. Signs and symptoms are: red, hot, unusually dry

skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse; or coma.).

Monitoring guidelines for heat and cold stress are included in Appendix D of the Health and Safety Plan Workbook.

6.6 Cold Exposure

When working outdoors in temperatures below freezing, workers can become frostbitten.

Exposure to extreme cold can cause severe injury to the body surface or can result in profound generalized cooling, causing death. In cold weather, precautions should be taken to prevent cold exposure by wearing properly insulated garments and taking warm-up breaks when necessary.

Symptoms of cold exposure are:

- o FROST NIP OR INCIPIENT FROSTBITE: characterized by sudden blanching or whitening of the skin,
- o SUPERFICIAL FROSTBITE: which causes the skin to become waxy or white and superficially firm, but resilient beneath,
- o DEEP FROSTBITE: characterized by cold, pale, solid skin tissues, and
- o SYSTEMIC HYPOTHERMIA: caused by exposure to freezing or rapidly dropping temperature. Symptoms are usually exhibited in five stages including shivering; apathy; listlessness, sleepiness and rapid cooling of the body temperature to less

than 95 °F; unconsciousness, glassy stare, slow pulse and slow respiratory rate; freezing of the extremities; and death.

6.7 Noise Exposure

Workers can be exposed to noise while working on Environmental Restoration sites when using heavy equipment such as mixers, pumps, air compressors, electrical generators, drill rigs, heavy construction equipment, and jack hammers. Where noise levels equal or exceed 80 dBA 8-hr time weighted average (TWA), the requirements of EG&G's Health & Safety Practices Manual, Procedure 7.06 shall be complied with. Noise exposure shall be controlled to levels below those stipulated in Table 6-1, or adequate hearing protection shall be required of all exposed personnel. Industrial Hygiene shall be responsible for noise monitoring of EG&G employees. The RFP uses Threshold Limit Values established by the American Conference of Governmental Hygienists (ACGIH) for noise exposure.

6.8 Mechanical Hazards

There are numerous mechanical hazards associated with the tasks which are scheduled at identified Environmental Restoration sites. Potential mechanical hazards at ER sites include hazards associated with the operation of heavy equipment such as air compressors, backhoes, drill rigs, trenchers, electrical motors and pumps. Heavy equipment must be maintained in good working order. Motors, chases, blades, bladeholders, tracks, drives, hydraulic and pneumatic mechanisms, and transmissions should be inspected each day. Minimum requirements for operating and maintaining heavy equipment include:

- o ensuring that machinery is not used on inclines where it could roll over,

- o not leaving running equipment unattended,
- o requiring seat belts for equipment that has roll over protective structures,
- o providing at least one 2 lb B/C fire extinguisher in a vehicle located within 100 feet of construction operations, and
- o maintaining an appropriate amount of fuel in equipment for emergency use.

Underground and overhead utilities could be potential hazards on some locations. Information concerning the safe use of cranes and derricks is in Section 12.00 of the EG&G Health & Safety Practices Manual.

Operational Safety Analyses (OSA), Job Safety Analyses (JSAs), Standard Operating Procedures (SOPs) and/or Waste Operation (WO) procedures will be written prior to performing tasks at ER sites to identify potential hazards and to document a safe procedure for performing the task (see Section 3.3 for a list of existing SOPs). A health and safety manual is planned for Rocky Flats construction activities. Contact the construction safety department for related information.

6.9 Confined Space Entry

Confined space entry may be required on environmental restoration sites. RFP procedures for working in a confined space are documented in the Health and Safety Practices Manual, Chapter 6.04. This procedure documents responsibilities, training requirements, ventilation, atmospheric testing, protective equipment, confined space entry permits, and posting.

TABLE 6-1

THRESHOLD LIMIT VALUES FOR NOISE

Duration per Day Hours	Sound Level DBA*
16	80
8	85
4	90
2	95
1	100
1/2	105
1/4	110
1/8	115**

*Sound level in decibels are measured on a sound meter, conforming as a minimum to the requirements of the American National Standards Specification for Sound Level Meters, S1.4 (1971 Type S2A, and set to use the A-weighted network with slow meter response).

**No exposure to continuous or intermittent in excess of 115 DBA.

CHAPTER 7

EMERGENCY RESPONSE

7.0 Introduction

A site specific emergency response plan must be developed for each ER site which must detail how emergencies will be handled safely and effectively. OSHA requirements for site emergency response plans are explained in OSHA 1910.120(l) [see Appendix A]. Environmental Restoration emergency response plans should incorporate the Rocky Flats Emergency Plan and the RCRA Contingency Plan to provide a comprehensive emergency response plan applicable to these sites.

7.1 Purpose

Emergency procedures minimize the impact of any emergency, or unusual occurrence, upon the health and safety of personnel at ER remedial project work sites. These procedures also identify the manpower and equipment available for industrial, radiological, and natural emergencies. Specific actions for responding to accidents and injuries at ER remedial project work sites are contained in this chapter.

The periodic rehearsals of site specific emergency response procedures shall be documented as part of the overall training program for site operations. The responders and key people affected by the use of these procedures shall provide written comments and a critique of the effectiveness of the response procedures after all training exercises. This information shall be used by the ER Project Manager to evaluate and modify the emergency response program.

7.2 Key Personnel

The names and phone extensions of key personnel at ER remedial project sites with the authority and training to respond to accidents and emergencies must be provided in the Site Plan and

posted on site so that they are readily accessible to site workers. Key ER site personnel and their succession of authority in the event of an emergency is as follows:

1. Environmental Restoration Project Manager
2. Site Health & Safety Coordinator
3. Subcontractor Field Engineer
4. Subcontractor Health & Safety Officer

Other important Rocky Flats emergency numbers include:

- o EMT/AMBULANCE ext. 2911
- o FIRE ext. 2911
- o POLICE/SECURITY ext. 2911

The Emergency Coordinator (EC) for the Rocky Flats Plant (RFP) is the Shift Supervisor on duty. The EC is responsible for the implementation and coordination of the RFP Contingency Plan. The EC is responsible for determining the extent of the emergency, assessing hazards to human health and the environment, and coordinating emergency response activities.

7.3 Medical Emergency Response Procedures

If an employee working in a contaminated area is physically injured, Red Cross First-Aid procedures will be followed if immediate medical attention is necessary. The Subcontractor H & S Coordinator is required to be a current card holder for the Red Cross First-Aid and adult CPR courses. Emergency medical assistance is available 7 days a week, 24 hours per day on plant site by calling 2911. Because of their proximity, medical assistance will be readily available on all ER sites and therefore, only initial patient stabilization (and only if the situation is life-threatening) should be necessary by site personnel. The texts provided for the Red Cross courses shall be kept in the site manager's office at the ER remedial project site for

use as Standard Operating Procedures for medical emergencies. The following list provides examples of medical emergencies that should be planned for:

- o fractures, dislocations, sprains, and strains
- o severe bleeding, cuts, scrapes, and bites
- o temperature extremes disorders
- o heart attacks and strokes
- o seizures
- o diabetic emergencies
- o poisoning
- o burns, including fire and chemical
- o shock

7.3.1 Emergency Decontamination

When an injured person is contaminated, a decision will be required to give priority to first aid or decontamination. If the condition of the patient is life-threatening, e.g. a heart attack, first aid actions will take priority over decontamination unless the contamination would harm response personnel. Figure 7-1, Decision Aid for Emergency Decontamination, should be used to make this decision. When it is determined that decontamination will not take precedence over the treatment of the injury, notify the Medical Department to advise the medical personnel of potential contamination.

7.4 Fire Response Procedures

The actions to be taken when a fire occurs at ER remedial project work sites shall be identified in the Site Plan to provide the workers with guidance. In all cases, the Fire Department shall be notified at ext. 2911.

- o Small, localized fires shall be handled using the appropriate fire extinguishers to

bring the occurrence under control. Fire extinguishers are to be used by trained personnel only.

- o Uncontrolled fires shall be handled by the Fire Department. Workers shall call ext. 2911, then evacuate the area. (Workers shall call from the ER site only when it is safe to do so. If the situation is life-threatening, evacuate to a safe location and then notify the Fire Department.)
- o If there is a potential for the release of toxic gases, all persons in the immediate vicinity shall be evacuated (sound the evacuation alarm). The fire department must then be informed of the toxic gases.

7.5 Spill Response Procedures

In the event of a spill of a liquid hazardous substance that is greater than one pint or one pound, a solid hazardous substance spill greater than one pound or any gaseous release, the first response is to notify the site supervisor and the Shift Superintendent. Call 2911 for reporting emergency spills (life threatening). Call 2914 for reporting non-emergency spills. All spills meeting the above criteria must be reported to the Shift Superintendent, who will make appropriate notifications to determine and implement appropriate responses. If it can be safely accomplished, site personnel can take immediate action to mitigate a spill when it is discovered. Personnel shall only take mitigating action when they are certain of the hazards that exist and are trained to react appropriately. The Shift Superintendent must be immediately informed of the spill. If a hazardous substance spill poses no additional risks than those normally experienced during normal duties, the employee may be instructed to clean up the spill. Occupational Safety, Industrial Hygiene, Radiological Engineering, Radiological Operations or other applicable departments shall be available for additional instruction on how to handle minor spills.

Tasks that could result in a spill must be identified in the site specific health and safety plan. In addition, a list of materials that will be maintained on the ER remedial project site to be used for spill response and the detailed actions to be taken to respond to the spill must be included.

7.6 Notification and Reporting

The employee discovering an emergency is responsible for immediately reporting the situation, by the most expeditious means available, to the person in charge at the ER remedial project site. On-site communication must be listed in the Site Plan. If phones are not available on site, radio contact must be maintained with someone who could report an accident immediately. One or more of the following items must be available on each ER site: telephone (cellular phones), portable radio, megaphone, bullhorn, or alarm devices.

The Environmental Restoration Department's representatives involved in emergency response include the Project Manager and the Site Health and Safety Officer. Subcontractor representatives responsible for responding to emergencies at their sites include the Health and Safety Coordinator/Officer and the Field Supervisor.

When reporting an emergency, provide as much detail as possible. A decision to dispatch any or all of the following equipment will be made on the information provided:

FIRE ENGINE
AMBULANCE
HAZMAT RESPONSE VEHICLE

In addition, provide the following information to the Emergency Dispatcher:

- o your name
- o your location
- o exact location of the emergency

- o nature of the emergency
- o condition of patient if applicable (breathing, consciousness, bleeding, etc.)
- o special hazards in the area
- o any other information requested

If no details are given, emergency response personnel will respond automatically.

7.7 Evacuation Plan

The evacuation plan is an established set of procedures directing employees to a safe assembly area during an emergency to ensure their safety or to enhance the emergency response. Major emergencies that could threaten human health or the environment may require that an area, a building, or the entire plant be evacuated.

Emergency procedures shall be prepared for ER sites to notify personnel of signals, evacuation routes, assembly areas, and safety issues. Evacuation signals may be a verbal command by a Site Health and Safety Coordinator or the Emergency Coordinator (EC); an alarm; or the employee's decision to evacuate for their protection.

When evacuation of any part of the facility is called for by the EC, all employees, contractors and visitors in that area will immediately leave the work area and proceed to the designated assembly area. Rocky Flats personnel will be accounted for by their supervisors. A list of visiting personnel will be available from the site and building sign-in records. Generally, if personnel are downwind of the incident, they will evacuate perpendicular to the wind direction, and if they are upwind of the incident, they will evacuate in the upwind direction.

7.8 Emergency Equipment

Heavy equipment used for day-to-day operations may be required during an emergency. This equipment should be maintained in good condition and with a fuel level greater than one-fourth

full. Equipment should be readily repaired when defects are detected so that the equipment is always available for use.

Personal protective equipment must be kept in reserve and maintained for emergency use. This equipment may be from the same stock that is used for daily operations provided the portion of stock reserved for emergency use is not depleted. The next level of protection from that used for routine operations must be available. For example, if Level C is the maximum routine level of protection used, then Level B protective equipment must be on hand for emergency use. This may include maintaining SCBA units on a site using only air purifying respirators.

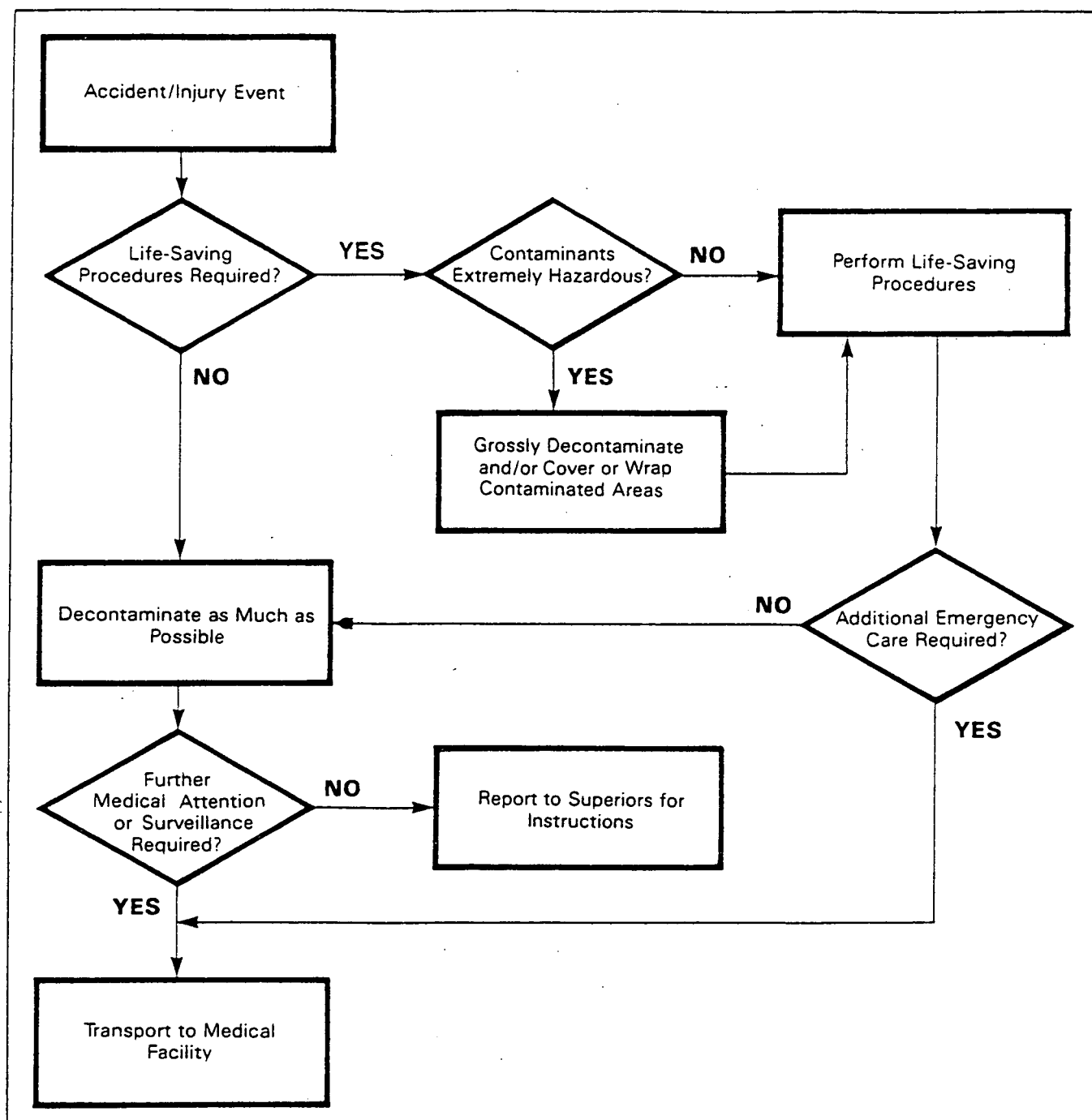
Other equipment that should be available on each ER site include:

- o first aid kits via EMTs
- o fire extinguisher & blanket
- o 15-minute eye wash and quick drench shower
- o 10 gallons of water, in portable containers
- o decontamination solutions appropriate for site hazards

7.9 Alarms

All site personnel will be trained to immediately recognize RFP and ER site alarm signals. Standard alarm signals must be documented in each Site Plan. Subcontractors can call 966-7541 to listen to a recording of RFP alarm signals and the significance of each.

Figure 7-1: Decision Aid for Emergency Decontamination



APPENDIX A
HAZARDOUS WASTE OPERATIONS
AND EMERGENCY RESPONSE

40 CFR 1910.120

(2) *Design pressure and classification of containers.* (i) The minimum design pressure for containers shall be 250 p.s.i.g.

(ii) The shell or head thickness of any container shall not be less than three-sixteenths inch.

(3) *Mounting of containers.* All containers and flow-control devices shall be securely mounted.

(4) *Container valves and accessories.*

(i) Each container shall have a fixed liquid-level gage.

(ii) The filling connection shall be fitted with a combination back-pressure check valve and an excess-flow valve; one double or two single back-pressure check valves; or a positive shutoff valve in conjunction with an internal back-pressure check valve or an internal excess-flow valve.

(iii) The applicator tank may be filled by venting to open air provided the bleeder valve orifice does not exceed seven-sixteenths inch in diameter.

(iv) Regulation equipment may be connected directly to the tank coupling or flange, in which case a flexible connection shall be used between such regulating equipment and the remainder of the liquid withdrawal system. Regulating equipment not so installed shall be flexibly connected to the container shutoff valve.

(v) No excess flow valve is required in the liquid withdrawal line provided the controlling orifice between the contents of the container and the outlet of the shutoff valve does not exceed seven-sixteenths inch in diameter.

§1910.112 [Reserved].

§1910.113 [Reserved].

§1910.114 Effective dates.

(a) The provisions of this Subpart H shall become effective on August 27, 1971, except as provided in the remaining paragraphs of this section.

(b) The following provisions shall become effective on February 15, 1972:

§1910.101(b).

§1910.102.

§1910.103 (a)(2), (b)(1)(i), (b)(1)(iii), (b)(2)(ii), and (b)(3).

§1910.105.

§1910.106 (b)(1), (b)(2), (b)(3), and (b)(4).

§1910.106 (b)(5), (c)(1), (c)(2), (c)(3), (c)(4),

(c)(5), (c)(6), (d)(2), (d)(3)(ii), (d)(4)(i),

(d)(4)(iii), (d)(4)(iv), (d)(5)(v), (d)(5)(vi)(a),

(e)(3)(iii), (e)(3)(v), (e)(4), (e)(7), (f)(2)(iii),

(f)(3)(i), (f)(4)(iii), (f)(4)(iv), (f)(4)(viii), (f)(5), (g), (h), and (i).

§1910.107(b)(1), (b)(2), (b)(3), (b)(4), (b)(5)(i), (b)(5)(iii), (b)(5)(iv), (b)(6), (b)(7), (b)(8), (b)(10), (c)(1), (c)(4), (c)(5), (c)(6), (c)(7), (d), (e)(7), (e)(8), (f)(1), (f)(2), (h), (i), (j), (l)(2), (l)(3), (l)(5), (l)(6), (l)(7), and (m)(1).

§1910.108(b), (c), (e)(1), (g)(2), (g)(3), (g)(4), and (g)(5).

§1910.108(g)(6) and (h).

§1910.110.

§1910.111.

(c) Notwithstanding anything in paragraph (a), (b), or (d) of this section, any provision in any other section of this subpart which contains in itself a specific effective date or time limitation shall become effective on such date or shall apply in accordance with such limitation.

(d) Notwithstanding anything in paragraph (a), or (b) of this section, if any standard in 41 CFR Part 50-204, other than a national consensus standard incorporated by reference in §50-204.2(a)(1), is or becomes applicable at any time to any employment and place of employment, by virtue of the Walsh-Healey Public Contracts Act, or the Service Contract Act of 1965, or the National Foundation on Arts and Humanities Act of 1965, any corresponding established Federal standard in this Subpart H which is derived from 41 CFR Part 50-204 shall also become effective, and shall be applicable to such employment and place of employment on the same date.

§1910.115 Sources of standards.

Sec.	Source
1910.101	41 CFR 50-204.67, 70, and 71.
1910.102	41 CFR 50-204.66.
1910.103	NFPA No. 508-1968, Standard for Liquefied Hydrogen Systems at Consumer Sites.
1910.104	NFPA No. 566-1965, Standard for the Installation of Bulk Oxygen Systems at Consumer Sites.
1910.105-106	NFPA No. 30-1969, Flammable and Combustible Liquids Code.
1910.107	NFPA No. 33-1969, Standard for Spray Finishing Using Flammable and Combustible Materials.
1910.108	NFPA No. 34-1966, Standard for Dip Tanks Containing Flammable or Combustible Liquids.
1910.109	NFPA No. 495-1970, Code for Manufacture, Transportation, Storage and Use of Explosives and Blasting Agents.

Sec.	Source
1910.110	NFPA 58-69, Standard for the Handling of Liquefied Petroleum Gases.
1910.111	ANSI K61.1-1966, Storage and Handling of Anhydrous Ammonia.

§1910.116 Standards organizations.

National Fire Protection Association, 470 Atlantic Avenue, Boston, Massachusetts 02210.

National Plant Food Institute, 1700 K Street NW., Washington, D.C. 20006.

Compressed Gas Association Inc., 500 Fifth Avenue, New York, NY 10036.

American Society of Mechanical Engineers Inc., United Engineering Center, 345 East 47th Street, New York, NY 10017.

American Petroleum Institute, 1801 K Street NW., Washington, DC 20006.

National Board of Boiler and Pressure Vessel Inspectors, 1155 North High Street, Columbus, OH 43201.

American National Standards Institute, 1430 Broadway Street, New York, NY 10018.

American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, PA 19103.

Underwriters' Laboratories, Inc., (UL), 207 East Ohio Street, Chicago, IL 60611.

Fertilizer Institute, 1015 18th Street NW., Washington, DC 20036.

[Editor's note: The Occupational Safety and Health Administration adopted §1910.120 on March 6, 1989. It went into effect on March 6, 1990. Following is the text for the final rule, with revisions which are effective April 13, 1990.]

§ 1910.120 Hazardous waste operations and emergency response.

(a) *Scope, application, and definitions.*—(1) *Scope.* This section covers the following operations, unless the employer can demonstrate that the operation does not involve employee exposure or the reasonable possibility for employee exposure to safety or health hazards:

(i) Clean-up operations required by a governmental body, whether Federal, state, local or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA's National Priority Site List (NPL), state priority site lists, sites recommended for

[Sec. 1910.120(a)(1)(i)]

the EPA NPL, and initial investigations of government identified sites which are conducted before the presence or absence of hazardous substances has been ascertained);

(ii) Corrective actions involving clean-up operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 U.S.C. 6901 et seq.);

(iii) Voluntary clean-up operations at sites recognized by Federal, state, local or other governmental bodies as uncontrolled hazardous waste sites;

(iv) Operations involving hazardous wastes that are conducted at treatment, storage, and disposal (TSD) facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA; or by agencies under agreement with U.S.E.P.A. to implement RCRA regulations; and

(v) Emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard.

(2) *Application.* (i) All requirements of Part 1910 and Part 1926 of Title 29 of the Code of Federal Regulations apply pursuant to their terms to hazardous waste and emergency response operations whether covered by this section or not. If there is a conflict or overlap, the provision more protective of employee safety and health shall apply without regard to 29 CFR 1910.5(c)(1).

(ii) Hazardous substance clean-up operations within the scope of paragraphs (a)(1)(i) through (a)(1)(iii) of this section must comply with all paragraphs of this section except paragraphs (p) and (q).

(iii) Operations within the scope of paragraph (a)(1)(iv) of this section must comply only with the requirements of paragraph (p) of this section.

Notes and Exceptions: (A) All provisions of paragraph (p) of this section cover any treatment, storage or disposal (TSD) operation regulated by 40 CFR parts 264 and 265 or by state law authorized under RCRA, and required to have a permit or interim status from EPA pursuant to 40 CFR 270.1 or from a state agency pursuant to RCRA.

(B) Employers who are not required to have a permit or interim status because they are conditionally exempt small quantity generators under 40 CFR 261.5 or are generators who qualify under 40 CFR 262.34 for exemptions from regulation under 40 CFR parts 264, 265 and 270 ("excepted employers") are not covered by paragraphs (p)(1) through (p)(7) of this section. Excepted employers who are required by the EPA or state agency to have their employees engage in emergency response or who direct their employees to engage in emergency response are covered by

paragraph (p)(8) of this section, and cannot be exempted by (p)(8)(i) of this section. Excepted employers who are not required to have employees engage in emergency response, who direct their employees to evacuate in the case of such emergencies and who meet the requirements of paragraph (p)(8)(i) of this section are exempt from the balance of paragraph (p)(8) of this section.

(C) If an area is used primarily for treatment, storage or disposal, any emergency response operations in that area shall comply with paragraph (p)(8) of this section. In other areas not used primarily for treatment, storage, or disposal, any emergency response operations shall comply with paragraph (q) of this section. Compliance with the requirements of paragraph (q) of this section shall be deemed to be in compliance with the requirements of paragraph (p)(8) of this section.

[1910.120(a)(2)(iii) corrected, effective April 13, 1990, by 55 FR 14073, April 13, 1990]

(iv) Emergency response operations for releases of, or substantial threats of releases of, hazardous substances which are not covered by paragraphs (a)(1)(i) through (a)(1)(iv) of this section must only comply with the requirements of paragraph (q) of this section.

(3) *Definitions—"Buddy system"* means a system of organizing employees into work groups in such a manner that each employee of the work group is designated to be observed by at least one other employee in the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

"Clean-up operation" means an operation where hazardous substances are removed, contained, incinerated, neutralized, stabilized, cleared-up, or in any other manner processed or handled with the ultimate goal of making the site safer for people or the environment.

"Decontamination" means the removal of hazardous substances from employees and their equipment to the extent necessary to preclude the occurrence of foreseeable adverse health effects.

"Emergency response" or "responding to emergencies" means a response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance. Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel are not considered to be emergency responses

within the scope of this standard. Responses to releases of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure) are not considered to be emergency responses.

"Facility" means (A) any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, storage container, motor vehicle, rolling stock, or aircraft, or (B) any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any water-borne vessel.

(3) *"Hazardous materials response (HAZMAT) team"* means an organized group of employees, designated by the employer, who are expected to perform work to handle and control actual or potential leaks or spills of hazardous substances requiring possible close approach to the substance. The team members perform responses to releases or potential releases of hazardous substances for the purpose of control or stabilization of the incident. A HAZMAT team is not a fire brigade nor is a typical fire brigade a HAZMAT team. A HAZMAT team, however, may be a separate component of a fire brigade or fire department.

"Hazardous substance" means any substance designated or listed under paragraphs (A) through (D) of this definition, exposure to which results or may result in adverse effects on the health or safety of employees:

(A) Any substance defined under section 101(14) of CERCLA;

(B) Any biological agent and other disease-causing agent which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any person, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations in such persons or their offspring;

[Definition of "hazardous substance" revised, effective April 13, 1990, by 55 FR 14073, April 13, 1990]

(C) Any substance listed by the U.S. Department of Transportation as haz-

ardous materials under 49 CFR 172.101 and appendices; and

(D) Hazardous waste as herein defined.

"Hazardous waste" means—

(A) A waste or combination of wastes as defined in 40 CFR 261.3, or

(B) Those substances defined as hazardous wastes in 49 CFR 171.8.

"Hazardous waste operation" means any operation conducted within the scope of this standard.

"Hazardous waste site" or "Site" means any facility or location within the scope of this standard at which hazardous waste operations take place.

"Health hazard" means a chemical, mixture of chemicals or a pathogen for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. It also includes stress due to temperature extremes. Further definition of the terms used above can be found in Appendix A to 29 CFR 1910.1200.

"IDLH" or "Immediately dangerous to life or health" means an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere.

"Oxygen deficiency" means that concentration of oxygen by volume below which atmosphere supplying respiratory protection must be provided. It exists in atmospheres where the percentage of oxygen by volume is less than 19.5 percent oxygen.

"Permissible exposure limit" means the exposure, inhalation or dermal permissible exposure limit specified in 29 CFR Part 1910, Subparts G and Z.

"Published exposure level" means the exposure limits published in "NIOSH Recommendations for Occupational Health Standards" dated 1986 incorporated by reference, or if none is specified, the exposure limits published in

the standards specified by the American Conference of Governmental Industrial Hygienists in their publication "Threshold Limit Values and Biological Exposure Indices for 1987-88" dated 1987 incorporated by reference.

"Post emergency response" means that portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and clean-up of the site has begun. If post emergency response is performed by an employer's own employees who were part of the initial emergency response, it is considered to be part of the initial response and not post emergency response. However, if a group of an employer's own employees, separate from the group providing initial response, performs the clean-up operation, then the separate group of employees would be considered to be performing post-emergency response and subject to paragraph (q)(11) of this section.

[Definition of "Post emergency response" revised, effective April 13, 1990, by 55 FR 14073, April 13, 1990]

"Qualified person" means a person with specific training, knowledge and experience in the area for which the person has the responsibility and the authority to control.

"Site safety and health supervisor (or official)" means the individual located on a hazardous waste site who is responsible to the employer and has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with applicable safety and health requirements.

"Small quantity generator" means a generator of hazardous wastes who in any calendar month generates no more than 1,000 kilograms (2,205 pounds) of hazardous waste in that month.

"Uncontrolled hazardous waste site" means an area where an accumulation of hazardous waste creates a threat to the health and safety of individuals or the environment or both. Some sites are found on public lands, such as those created by former municipal, county or state landfills where illegal or poorly managed waste disposal has taken place. Other sites are found on private property, often belonging to generators or former generators of hazardous waste. Examples of such sites include, but are not limited to, surface impoundments, landfills, dumps, and tank or drum farms. Normal operations at TSD sites are not covered by this definition.

(b) *Safety and health program.*

Note to (b): Safety and health programs developed and implemented to meet other Federal, state, or local regulations are considered acceptable in meeting this requirement if they cover or are modified to cover the topics required in this paragraph. An additional or separate safety and health program is not required by this paragraph.

(1) *General.* (i) Employers shall develop and implement a written safety and health program for their employees involved in hazardous waste operations. The program shall be designed to identify, evaluate, and control safety and health hazards, and provide for emergency response for hazardous waste operations.

(ii) The written safety and health program shall incorporate the following:

(A) An organizational structure;

(B) A comprehensive workplan;

(C) A site-specific safety and health plan which need not repeat the employer's standard operating procedures required in paragraph (b)(1)(ii)(F) of this section;

(D) The safety and health training program;

(E) The medical surveillance program;

(F) The employer's standard operating procedures for safety and health; and

(G) Any necessary interface between general program and site specific activities.

(iii) *Site excavation.* Site excavations created during initial site preparation or during hazardous waste operations shall be shored or sloped as appropriate to prevent accidental collapse in accordance with Subpart P of 29 CFR Part 1926.

(iv) *Contractors and sub-contractors.* An employer who retains contractor or sub-contractor services for work in hazardous waste operations shall inform those contractors, sub-contractors, or their representatives of the site emergency response procedures and any potential fire, explosion, health, safety or other hazards of the hazardous waste operation that have been identified by the employer, including those identified in the employer's information program.

(v) *Program availability.* The written safety and health program shall be made available to any contractor or subcontractor or their representative who will be involved with the hazardous waste operation; to employees; to employee designated representatives; to OSHA personnel, and to personnel of

[Sec. 1910.120(b)(1)(v)]

other Federal, state, or local agencies with regulatory authority over the site.

(2) *Organizational structure part of the site program.*—(i) The organizational structure part of the program shall establish the specific chain of command and specify the overall responsibilities of supervisors and employees. It shall include, at a minimum, the following elements:

(A) A general supervisor who has the responsibility and authority to direct all hazardous waste operations.

(B) A site safety and health supervisor who has the responsibility and authority to develop and implement the site safety and health plan and verify compliance.

(C) All other personnel needed for hazardous waste site operations and emergency response and their general functions and responsibilities.

(D) The lines of authority, responsibility, and communication.

(ii) The organizational structure shall be reviewed and updated as necessary to reflect the current status of waste site operations.

(3) *Comprehensive workplan part of the site program.* The comprehensive workplan part of the program shall address the tasks and objectives of the site operations and the logistics and resources required to reach those tasks and objectives.

(i) The comprehensive workplan shall address anticipated clean-up activities as well as normal operating procedures which need not repeat the employer's procedures available elsewhere.

(ii) The comprehensive workplan shall define work tasks and objectives and identify the methods for accomplishing those tasks and objectives.

(iii) The comprehensive workplan shall establish personnel requirements for implementing the plan.

(iv) The comprehensive workplan shall provide for the implementation of the training required in paragraph (e) of this section.

(v) The comprehensive workplan shall provide for the implementation of the required informational programs required in paragraph (i) of this section.

(vi) The comprehensive workplan shall provide for the implementation of the medical surveillance program described in paragraph (f) of this section.

(4) *Site-specific safety and health plan part of the program.*—(i) *General.* The site safety and health plan, which must

be kept on site, shall address the safety and health hazards of each phase of site operation and include the requirements and procedures for employee protection.

(ii) *Elements.* The site safety and health plan, as a minimum, shall address the following:

(A) A safety and health risk or hazard analysis for each site task and operation found in the workplan.

(B) Employee training assignments to assure compliance with paragraph (e) of this section.

(C) Personal protective equipment to be used by employees for each of the site tasks and operations being conducted as required by the personal protective equipment program in paragraph (g)(5) of this section.

(D) Medical surveillance requirements in accordance with the program in paragraph (f) of this section.

(E) Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment to be used.

(F) Site control measures in accordance with the site control program required in paragraph (d) of this section.

(G) Decontamination procedures in accordance with paragraph (k) of this section.

(H) An emergency response plan meeting the requirements of paragraph (l) of this section for safe and effective responses to emergencies, including the necessary PPE and other equipment.

(I) Confined space entry procedures.

(J) A spill containment program meeting the requirements of paragraph (j) of this section.

(iii) *Pre-entry briefing.* The site specific safety and health plan shall provide for pre-entry briefings to be held prior to initiating any site activity, and at such other times as necessary to ensure that employees are apprised of the site safety and health plan and that this plan is being followed. The information and data obtained from site characterization and analysis work required in paragraph (c) of this section shall be used to prepare and update the site safety and health plan.

(iv) *Effectiveness of site safety and health plan.* Inspections shall be conducted by the site safety and health supervisor or, in the absence of that

individual, another individual who is knowledgeable in occupational safety and health, acting on behalf of the employer as necessary to determine the effectiveness of the site safety and health plan. Any deficiencies in the effectiveness of the site safety and health plan shall be corrected by the employer.

(c) *Site characterization and analysis.*—(1) *General.* Hazardous waste sites shall be evaluated in accordance with this paragraph to identify specific site hazards and to determine the appropriate safety and health control procedures needed to protect employees from the identified hazards.

(2) *Preliminary evaluation.* A preliminary evaluation of a site's characteristics shall be performed prior to site entry by a qualified person in order to aid in the selection of appropriate employee protection methods prior to site entry. Immediately after initial site entry, a more detailed evaluation of the site's specific characteristics shall be performed by a qualified person in order to further identify existing site hazards and to further aid in the selection of the appropriate engineering controls and personal protective equipment for the tasks to be performed.

(3) *Hazard identification.* All suspected conditions that may pose inhalation or skin absorption hazards that are immediately dangerous to life or health (IDLH), or other conditions that may cause death or serious harm, shall be identified during the preliminary survey and evaluated during the detailed survey. Examples of such hazards include, but are not limited to, confined space entry, potentially explosive or flammable situations, visible vapor clouds, or areas where biological indicators such as dead animals or vegetation are located.

(4) *Required information.* The following information to the extent available shall be obtained by the employer prior to allowing employees to enter a site:

(i) Location and approximate size of the site.

(ii) Description of the response activity and/or the job task to be performed.

(iii) Duration of the planned employee activity.

(iv) Site topography and accessibility by air and roads.

(v) Safety and health hazards expected at the site.

(vi) Pathways for hazardous substance dispersion.

[Sec. 1910.120(c)(4)(vi)]

(vii) Present status and capabilities of emergency response teams that would provide assistance to hazardous waste clean-up site employees at the time of an emergency.

(viii) Hazardous substances and health hazards involved or expected at the site, and their chemical and physical properties.

(5) *Personal protective equipment.* Personal protective equipment (PPE) shall be provided and used during initial site entry in accordance with the following requirements:

(i) Based upon the results of the preliminary site evaluation, an ensemble of PPE shall be selected and used during initial site entry which will provide protection to a level of exposure below permissible exposure limits and published exposure levels for known or suspected hazardous substances and health hazards, and which will provide protection against other known and suspected hazards identified during the preliminary site evaluation. If there is no permissible exposure limit or published exposure level, the employer may use other published studies and information as a guide to appropriate personal protective equipment.

(ii) If positive-pressure self-contained breathing apparatus is not used as part of the entry ensemble, and if respiratory protection is warranted by the potential hazards identified during the preliminary site evaluation, an escape self-contained breathing apparatus of at least five minute's duration shall be carried by employees during initial site entry.

(iii) If the preliminary site evaluation does not produce sufficient information to identify the hazards or suspected hazards of the site, an ensemble providing protection equivalent to Level B PPE shall be provided as minimum protection, and direct reading instruments shall be used as appropriate for identifying IDLH conditions. (See Appendix B for a description of Level B hazards and the recommendations for Level B protective equipment.)

(iv) Once the hazards of the site have been identified, the appropriate PPE shall be selected and used in accordance with paragraph (g) of this section.

(6) *Monitoring.* The following monitoring shall be conducted during initial site entry when the site evaluation produces information that shows the potential for ionizing radiation or IDLH conditions, or when the site informa-

tion is not sufficient reasonably to eliminate these possible conditions:

(i) Monitoring with direct reading instruments for hazardous levels of ionizing radiation.

(ii) Monitoring the air with appropriate direct reading test equipment (i.e., combustible gas meters, detector tubes) for IDLH and other conditions that may cause death or serious harm (combustible or explosive atmospheres, oxygen deficiency, toxic substances).

(iii) Visually observing for signs of actual or potential IDLH or other dangerous conditions.

(iv) An ongoing air monitoring program in accordance with paragraph (h) of this section shall be implemented after site characterization has determined the site is safe for the start-up of operations.

(7) *Risk identification.* Once the presence and concentrations of specific hazardous substances and health hazards have been established, the risks associated with these substances shall be identified. Employees who will be working on the site shall be informed of any risks that have been identified. In situations covered by the Hazard Communication Standard, 29 CFR 1910.1200, training required by that standard need not be duplicated.

Note to (c)(7).—Risks to consider include, but are not limited to:

(a) Exposures exceeding the permissible exposure limits and published exposure levels.

(b) IDLH concentrations.

(c) Potential skin absorption and irritation sources.

(d) Potential eye irritation sources.

(e) Explosion sensitivity and flammability ranges.

(f) Oxygen deficiency.

(8) *Employee notification.* Any information concerning the chemical, physical, and toxicologic properties of each substance known or expected to be present on site that is available to the employer and relevant to the duties an employee is expected to perform shall be made available to the affected employees prior to the commencement of their work activities. The employer may utilize information developed for the hazard communication standard for this purpose.

(d) *Site control.*—(1) *General.* Appropriate site control procedures shall be implemented to control employee exposure to hazardous substances before clean-up work begins.

(2) *Site control program.* A site control program for protecting employees which is part of the employer's site safety and health program required in paragraph (b) of this section shall be developed during the planning stages of a hazardous waste clean-up operation and modified as necessary as new information becomes available.

(3) *Elements of the site control program.* The site control program shall, as a minimum, include: A site map; site work zones; the use of a "buddy system"; site communications including alerting means for emergencies; the standard operating procedures or safe work practices; and, identification of the nearest medical assistance. Where these requirements are covered elsewhere they need not be repeated.

(e) *Training.*—(1) *General.* (i) All employees working on site (such as but not limited to equipment operators, general laborers and others) exposed to hazardous substances, health hazards, or safety hazards and their supervisors and management responsible for the site shall receive training meeting the requirements of this paragraph before they are permitted to engage in hazardous waste operations that could expose them to hazardous substances, safety, or health hazards, and they shall receive review training as specified in this paragraph.

(ii) Employees shall not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility.

(2) *Elements to be covered.* The training shall thoroughly cover the following:

(i) Names of personnel and alternates responsible for site safety and health;

(ii) Safety, health and other hazards present on the site;

(iii) Use of personal protective equipment;

(iv) Work practices by which the employee can minimize risks from hazards;

(v) Safe use of engineering controls and equipment on the site;

(vi) Medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards; and

(vii) The contents of paragraphs (G) through (J) of the site safety and health plan set forth in paragraph (b)(4)(ii) of this section.

[Sec. 1910.120(e)(2)(vii)]

(3) *Initial training.* (i) General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor.

(ii) Workers on site only occasionally for a specific limited task (such as, but not limited to, ground water monitoring, land surveying, or geo-physical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

(iii) Workers regularly on site who work in areas which have been monitored and fully characterized indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing, shall receive a minimum of 24 hours of instruction off the site and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

(iv) Workers with 24 hours of training who are covered by paragraphs (e)(3)(ii) and (e)(3)(iii) of this section, and who become general site workers or who are required to wear respirators, shall have the additional 16 hours and two days of training necessary to total the training specified in paragraph (e)(3)(i). [Sec. 1910.120(e)(3)(iv) revised, effective April 13, 1990, by 55 FR 14073, April 13, 1990]

(4) *Management and supervisor training.* On-site management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations shall receive 40 hours initial training, and three days of supervised field experience (the training may be reduced to 24 hours and one day if the only area of their responsibility is employees covered by paragraphs (e)(3)(ii) and (e)(3)(iii)) and at least eight additional hours of specialized training at the time of job assignment on such topics as, but not limited to, the employer's

safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques.

(5) *Qualifications for trainers.* Trainers shall be qualified to instruct employees about the subject matter that is being presented in training. Such trainers shall have satisfactorily completed a training program for teaching the subjects they are expected to teach, or they shall have the academic credentials and instructional experience necessary for teaching the subjects. Instructors shall demonstrate competent instructional skills and knowledge of the applicable subject matter.

(6) *Training certification.* Employees and supervisors that have received and successfully completed the training and field experience specified in paragraphs (e)(1) through (e)(4) of this section shall be certified by their instructor or the head instructor and trained supervisor as having successfully completed the necessary training. A written certificate shall be given to each person so certified. Any person who has not been so certified or who does not meet the requirements of paragraph (e)(9) of this section shall be prohibited from engaging in hazardous waste operations.

(7) *Emergency response.* Employees who are engaged in responding to hazardous emergency situations at hazardous waste clean-up sites that may expose them to hazardous substances shall be trained in how to respond to such expected emergencies.

(8) *Refresher training.* Employees specified in paragraph (e)(1) of this section, and managers and supervisors specified in paragraph (e)(4) of this section, shall receive eight hours of refresher training annually on the items specified in paragraph (e)(2) and/or (e)(4) of this section, any critique of incidents that have occurred in the past year that can serve as training examples of related work, and other relevant topics.

(9) *Equivalent training.* Employers who can show by documentation or certification that an employee's work experience and/or training has resulted in training equivalent to that training required in paragraphs (e)(1) through (e)(4) of this section shall not be required to provide the initial training requirements of those paragraphs to

such employees. However, certified employees or employees with equivalent training new to a site shall receive appropriate, site specific training before site entry and have appropriate supervised field experience at the new site. Equivalent training includes any academic training or the training that existing employees might have already received from actual hazardous waste site work experience.

[Sec. 1910.120(e)(9) revised, effective April 13, 1990, by 55 FR 14073, April 13, 1990]

(f) *Medical surveillance—(1) General.* Employers engaged in operations specified in paragraphs (a)(1)(i) through (a)(1)(iv) of this section and not covered by (a)(2)(iii) exceptions and employers of employees specified in paragraph (q)(9) shall institute a medical surveillance program in accordance with this paragraph.

(2) *Employees covered.* The medical surveillance program shall be instituted by the employer for the following employees:

(i) All employees who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year;

(ii) All employees who wear a respirator for 30 days or more a year or as required by § 1910.134;

(iii) All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation; and

[1910.120(f)(2)(iii) revised, effective April 13, 1990, by 55 FR 14073, April 13, 1990]

(iv) Members of HAZMAT teams.

(3) *Frequency of medical examinations and consultations.* Medical examinations and consultations shall be made available by the employer to each employee covered under paragraph (f)(2) of this section on the following schedules:

(i) For employees covered under paragraphs (f)(2)(i), (f)(2)(ii), and (f)(2)(iv):

(A) Prior to assignment;

(B) At least once every twelve months for each employee covered unless the attending physician believes a longer interval (not greater than biennially) is appropriate;

(C) At termination of employment or reassignment to an area where the em-

[Sec. 1910.120(f)(3)(i)(C)]

employee would not be covered if the employee has not had an examination within the last six months;

(D) As soon as possible upon notification by an employee that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the employee has been injured or exposed above the permissible exposure limits or published exposure levels in an emergency situation;

(E) At more frequent times, if the examining physician determines that an increased frequency of examination is medically necessary.

(ii) For employees covered under paragraph (f)(2)(iii) and for all employees including those of employers covered by paragraph (a)(1)(v) who may have been injured, received a health impairment, developed signs or symptoms which may have resulted from exposure to hazardous substances resulting from an emergency incident, or exposed during an emergency incident to hazardous substances at concentrations above the permissible exposure limits or the published exposure levels without the necessary personal protective equipment being used:

(A) As soon as possible following the emergency incident or development of signs or symptoms;

(B) At additional times, if the examining physician determines that follow-up examinations or consultations are medically necessary.

(4) *Content of medical examinations and consultations.* (i) Medical examinations required by paragraph (f)(3) of this section shall include a medical and work history (or updated history if one is in the employee's file) with special emphasis on symptoms related to the handling of hazardous substances and health hazards, and to fitness for duty including the ability to wear any required PPE under conditions (i.e., temperature extremes) that may be expected at the work site.

(ii) The content of medical examinations or consultations made available to employees pursuant to paragraph (f) shall be determined by the attending physician. The guidelines in the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (See Appendix D, Reference #10) should be consulted.

(5) *Examination by a physician and costs.* All medical examinations and procedures shall be performed by or un-

der the supervision of a licensed physician, preferably one knowledgeable in occupational medicine, and shall be provided without cost to the employee, without loss of pay, and at a reasonable time and place.

(6) *Information provided to the physician.* The employer shall provide one copy of this standard and its appendices to the attending physician, and in addition the following for each employee:

(i) A description of the employee's duties as they relate to the employee's exposures.

(ii) The employee's exposure levels or anticipated exposure levels.

(iii) A description of any personal protective equipment used or to be used.

(iv) Information from previous medical examinations of the employee which is not readily available to the examining physician.

(v) Information required by § 1910.134.

(7) *Physician's written opinion.* (i) The employer shall obtain and furnish the employee with a copy of a written opinion from the attending physician containing the following:

(A) The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from work in hazardous waste operations or emergency response, or from respirator use.

(B) The physician's recommended limitations upon the employee's assigned work.

(C) The results of the medical examination and tests if requested by the employee.

(D) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further examination or treatment.

(ii) The written opinion obtained by the employer shall not reveal specific findings or diagnoses unrelated to occupational exposures.

(8) *Recordkeeping.* (i) An accurate record of the medical surveillance required by paragraph (f) of this section shall be retained. This record shall be retained for the period specified and meet the criteria of 29 CFR 1910.20.

(ii) The record required in paragraph (f)(8)(i) of this section shall include at least the following information:

(A) The name and social security number of the employee;

(B) Physician's written opinions, recommended limitations, and results of examinations and tests;

(C) Any employee medical complaints related to exposure to hazardous substances;

(D) A copy of the information provided to the examining physician by the employer, with the exception of the standard and its appendices.

(g) *Engineering controls, work practices, and personal protective equipment for employee protection.* Engineering controls, work practices, personal protective equipment, or a combination of these shall be implemented in accordance with this paragraph to protect employees from exposure to hazardous substances and safety and health hazards.

(1) *Engineering controls, work practices and PPE for substances regulated in Subparts G and Z.* (i) Engineering controls and work practices shall be instituted to reduce and maintain employee exposure to or below the permissible exposure limits for substances regulated by 29 CFR Part 1910, to the extent required by Subpart Z, except to the extent that such controls and practices are not feasible.

Note to (g)(1)(i): Engineering controls which may be feasible include the use of pressurized cabs or control booths on equipment, and/or the use of remotely operated material handling equipment. Work practices which may be feasible are removing all non-essential employees from potential exposure during opening of drums, wetting down dusty operations and locating employees upwind of possible hazards.

(ii) Whenever engineering controls and work practices are not feasible or not required, any reasonable combination of engineering controls, work practices and PPE shall be used to reduce and maintain employee exposures to or below the permissible exposure limits or dose limits for substances regulated by 29 CFR Part 1910, Subpart Z.

[1910.120(g)(1)(ii) revised, effective April 13, 1990, by 55 FR 14073, April 13, 1990]

(iii) The employer shall not implement a schedule of employee rotation as a means of compliance with permissible exposure limits or dose limits except when there is no other feasible way of complying with the airborne or dermal dose limits for ionizing radiation.

[Sec. 1910.120(g)(1)(iii)]

(iv) The provisions of 29 CFR, Subpart G, shall be followed.

(2) *Engineering controls, work practices, and PPE for substances not regulated in Subparts G and Z.* An appropriate combination of engineering controls, work practices and personal protective equipment shall be used to reduce and maintain employee exposure to or below published exposure levels for hazardous substances and health hazards not regulated by 29 CFR Part 1910, Subparts G and Z. The employer may use the published literature and MSDS as a guide in making the employer's determination as to what level of protection the employer believes is appropriate for hazardous substances and health hazards for which there is no permissible exposure limit or published exposure limit.

(3) *Personal protective equipment selection.* (i) Personal protective equipment (PPE) shall be selected and used which will protect employees from the hazards and potential hazards they are likely to encounter as identified during the site characterization and analysis.

(ii) Personal protective equipment selection shall be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, the task-specific conditions and duration, and the hazards and potential hazards identified at the site.

(iii) Positive pressure self-contained breathing apparatus, or positive pressure air-line respirators equipped with an escape air supply, shall be used when chemical exposure levels present will create a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape.

(iv) Totally-encapsulating chemical protective suits (protection equivalent to Level A protection as recommended in Appendix B) shall be used in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape.

(v) The level of protection provided by PPE selection shall be increased when additional information on site conditions indicates that increased protection is necessary to reduce employee exposures below permissible exposure limits and published exposure levels for hazardous substances and health haz-

ards. (See Appendix B for guidance on selecting PPE ensembles.)

Note to (g)(3): The level of employee protection provided may be decreased when additional information or site conditions show that decreased protection will not result in hazardous exposures to employees.

(vi) Personal protective equipment shall be selected and used to meet the requirements of 29 CFR Part 1910, Subpart I, and additional requirements specified in this section.

(4) *Totally-encapsulating chemical protective suits.* (i) Totally-encapsulating suits shall protect employees from the particular hazards which are identified during site characterization and analysis.

(ii) Totally-encapsulating suits shall be capable of maintaining positive air pressure. (See Appendix A for a test method which may be used to evaluate this requirement.)

(iii) Totally-encapsulating suits shall be capable of preventing inward test gas leakage of more than 0.5 percent. (See Appendix A for a test method which may be used to evaluate this requirement.)

(5) *Personal protective equipment (PPE) program.* A written personal protective equipment program, which is part of the employer's safety and health program required in paragraph (b) of this section or required in paragraph (p)(1) of this section and which is also a part of the site-specific safety and health plan shall be established. The PPE program shall address the elements listed below. When elements, such as donning and doffing procedures, are provided by the manufacturer of a piece of equipment and are attached to the plan, they need not be rewritten into the plan as long as they adequately address the procedure or element.

(i) PPE selection based upon site hazards.

(ii) PPE use and limitations of the equipment.

(iii) Work mission duration.

(iv) PPE maintenance and storage.

(v) PPE decontamination and disposal.

(vi) PPE training and proper fitting.

(vii) PPE donning and doffing procedures.

(viii) PPE inspection procedures prior to, during, and after use.

(ix) Evaluation of the effectiveness of the PPE program, and

(x) Limitations during temperature extremes, heat stress, and other appropriate medical considerations.

(h) *Monitoring—(1) General.* (i) Monitoring shall be performed in accordance with this paragraph where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances.

[1910.120(h)(1)(i) revised, effective April 13, 1990, by 55 FR 14073, April 13, 1990]

(ii) Air monitoring shall be used to identify and quantify airborne levels of hazardous substances and safety and health hazards in order to determine the appropriate level of employee protection needed on site.

(2) *Initial entry.* Upon initial entry, representative air monitoring shall be conducted to identify any IDLH condition, exposure over permissible exposure limits or published exposure levels, exposure over a radioactive material's dose limits or other dangerous condition such as the presence of flammable atmospheres or oxygen-deficient environments.

(3) *Periodic monitoring.* Periodic monitoring shall be conducted when the possibility of an IDLH condition or flammable atmosphere has developed or when there is indication that exposures may have risen over permissible exposure limits or published exposure levels since prior monitoring. Situations where it shall be considered whether the possibility that exposures have risen are as follows:

(i) When work begins on a different portion of the site.

(ii) When contaminants other than those previously identified are being handled.

(iii) When a different type of operation is initiated (e.g., drum opening as opposed to exploratory well drilling).

(iv) When employees are handling leaking drums or containers or working in areas with obvious liquid contamination (e.g., a spill or lagoon).

(4) *Monitoring of high-risk employees.* After the actual clean-up phase of any hazardous waste operation commences; for example, when soil, surface water or

[Sec. 1910.120(h)(4)]

containers are moved or disturbed; the employer shall monitor those employees likely to have the highest exposures to hazardous substances and health hazards likely to be present above permissible exposure limits or published exposure levels by using personal sampling frequently enough to characterize employee exposures. If the employees likely to have the highest exposure are over permissible exposure limits or published exposure limits, then monitoring shall continue to determine all employees likely to be above those limits. The employer may utilize a representative sampling approach by documenting that the employees and chemicals chosen for monitoring are based on the criteria stated above.

Note to (h): It is not required to monitor employees engaged in site characterization operations covered by paragraph (c) of this section.

(i) *Informational programs.* Employers shall develop and implement a program, which is part of the employer's safety and health program required in paragraph (b) of this section, to inform employees, contractors, and subcontractors (or their representative) actually engaged in hazardous waste operations of the nature, level and degree of exposure likely as a result of participation in such hazardous waste operations. Employees, contractors and subcontractors working outside of the operations part of a site are not covered by this standard.

(j) *Handling drums and containers—(1) General.* (i) Hazardous substances and contaminated soils, liquids, and other residues shall be handled, transported, labeled, and disposed of in accordance with this paragraph.

(ii) Drums and containers used during the clean-up shall meet the appropriate DOT, OSHA, and EPA regulations for the wastes that they contain.

(iii) When practical, drums and containers shall be inspected and their integrity shall be assured prior to being moved. Drums or containers that cannot be inspected before being moved because of storage conditions (i.e., buried beneath the earth, stacked behind other drums, stacked several tiers high in a pile, etc.) shall be moved to an accessible location and inspected prior to further handling.

(iv) Unlabelled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled.

(v) Site operations shall be organized to minimize the amount of drum or container movement.

(vi) Prior to movement of drums or containers, all employees exposed to the transfer operation shall be warned of the potential hazards associated with the contents of the drums or containers.

(vii) U.S. Department of Transportation specified salvage drums or containers and suitable quantities of proper absorbent shall be kept available and used in areas where spills, leaks, or ruptures may occur.

(viii) Where major spills may occur, a spill containment program, which is part of the employer's safety and health program required in paragraph (b) of this section, shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred.

(ix) Drums and containers that cannot be moved without rupture, leakage, or spillage shall be emptied into a sound container using a device classified for the material being transferred.

(x) A ground-penetrating system or other type of detection system or device shall be used to estimate the location and depth of buried drums or containers.

(xi) Soil or covering material shall be removed with caution to prevent drum or container rupture.

(xii) Fire extinguishing equipment meeting the requirements of 29 CFR Part 1910, Subpart L, shall be on hand and ready for use to control incipient fires.

(2) *Opening drums and containers.* The following procedures shall be followed in areas where drums or containers are being opened:

(i) Where an airline respirator system is used, connections to the source of air supply shall be protected from contamination and the entire system shall be protected from physical damage.

(ii) Employees not actually involved in opening drums or containers shall be kept a safe distance from the drums or containers being opened.

(iii) If employees must work near or adjacent to drums or containers being opened, a suitable shield that does not interfere with the work operation shall be placed between the employee and the drums or containers being opened to protect the employee in case of accidental explosion.

(iv) Controls for drum or container opening equipment, monitoring equipment, and fire suppression equipment shall be located behind the explosion-resistant barrier.

(v) When there is a reasonable possibility of flammable atmospheres being present, material handling equipment and hand tools shall be of the type to prevent sources of ignition.

(vi) Drums and containers shall be opened in such a manner that excess interior pressure will be safely relieved. If pressure can not be relieved from a remote location, appropriate shielding shall be placed between the employee and the drums or containers to reduce the risk of employee injury.

(vii) Employees shall not stand upon or work from drums or containers.

(3) *Material handling equipment.* Material handling equipment used to transfer drums and containers shall be selected, positioned and operated to minimize sources of ignition related to the equipment from igniting vapors released from ruptured drums or containers.

(4) *Radioactive wastes.* Drums and containers containing radioactive wastes shall not be handled until such time as their hazard to employees is properly assessed.

(5) *Shock sensitive wastes.* As a minimum, the following special precautions shall be taken when drums and containers containing or suspected of containing shock-sensitive wastes are handled:

(i) All non-essential employees shall be evacuated from the area of transfer.

(ii) Material handling equipment shall be provided with explosive containment devices or protective shields to protect equipment operators from exploding containers.

(iii) An employee alarm system capable of being perceived above surrounding light and noise conditions shall be used to signal the commencement and completion of explosive waste handling activities.

(iv) Continuous communications (i.e., portable radios, hand signals, telephones, as appropriate) shall be maintained between the employee-in-charge of the immediate handling area and both the site safety and health supervisor and the command post until such time as the handling operation is completed. Communication equipment or methods that could cause shock sensi-

[Sec. 1910.120(j)(5)(iv)]

tive materials to explode shall not be used.

(v) Drums and containers under pressure, as evidenced by bulging or swelling, shall not be moved until such time as the cause for excess pressure is determined and appropriate containment procedures have been implemented to protect employees from explosive relief of the drum.

(vi) Drums and containers containing packaged laboratory wastes shall be considered to contain shock-sensitive or explosive materials until they have been characterized.

Caution: Shipping of shock sensitive wastes may be prohibited under U.S. Department of Transportation regulations. Employers and their shippers should refer to 49 CFR 173.21 and 173.50.

(6) *Laboratory waste packs.* In addition to the requirements of paragraph (j)(5) of this section, the following precautions shall be taken, as a minimum, in handling laboratory waste packs (lab packs):

(i) Lab packs shall be opened only when necessary and then only by an individual knowledgeable in the inspection, classification, and segregation of the containers within the pack according to the hazards of the wastes.

(ii) If crystalline material is noted on any container, the contents shall be handled as a shock-sensitive waste until the contents are identified.

(7) *Sampling of drum and container contents.* Sampling of containers and drums shall be done in accordance with a sampling procedure which is part of the site safety and health plan developed for and available to employees and others at the specific worksite.

(8) *Shipping and transport.* (i) Drums and containers shall be identified and classified prior to packaging for shipment.

(ii) Drum or container staging areas shall be kept to the minimum number necessary to identify and classify materials safely and prepare them for transport.

(iii) Staging areas shall be provided with adequate access and egress routes.

(iv) Bulking of hazardous wastes shall be permitted only after a thorough characterization of the materials has been completed.

(9) *Tank and vault procedures.* (i) Tanks and vaults containing hazardous substances shall be handled in a

manner similar to that for drums and containers, taking into consideration the size of the tank or vault.

(ii) Appropriate tank or vault entry procedures as described in the employer's safety and health plan shall be followed whenever employees must enter a tank or vault.

(k) *Decontamination—(1) General.* Procedures for all phases of decontamination shall be developed and implemented in accordance with this paragraph.

(2) *Decontamination procedures.* (i) A decontamination procedure shall be developed, communicated to employees and implemented before any employees or equipment may enter areas on site where potential for exposure to hazardous substances exists.

(ii) Standard operating procedures shall be developed to minimize employee contact with hazardous substances or with equipment that has contacted hazardous substances.

(iii) All employees leaving a contaminated area shall be appropriately decontaminated; all contaminated clothing and equipment leaving a contaminated area shall be appropriately disposed of or decontaminated.

(iv) Decontamination procedures shall be monitored by the site safety and health supervisor to determine their effectiveness. When such procedures are found to be ineffective, appropriate steps shall be taken to correct any deficiencies.

(3) *Location.* Decontamination shall be performed in geographical areas that will minimize the exposure of uncontaminated employees or equipment to contaminated employees or equipment.

(4) *Equipment and solvents.* All equipment and solvents used for decontamination shall be decontaminated or disposed of properly.

(5) *Personal protective clothing and equipment.* (i) Protective clothing and equipment shall be decontaminated, cleaned, laundered, maintained or replaced as needed to maintain their effectiveness.

(ii) Employees whose non-impermeable clothing becomes wetted with hazardous substances shall immediately remove that clothing and proceed to shower. The clothing shall be disposed of or decontaminated before it is removed from the work zone.

(6) *Unauthorized employees.* Unauthorized employees shall not remove protective clothing or equipment from change rooms.

(7) *Commercial laundries or cleaning establishments.* Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment shall be informed of the potentially harmful effects of exposures to hazardous substances.

(8) *Showers and change rooms.* Where the decontamination procedure indicates a need for regular showers and change rooms outside of a contaminated area, they shall be provided and meet the requirements of 29 CFR 1910.141. If temperature conditions prevent the effective use of water, then other effective means for cleansing shall be provided and used.

(l) *Emergency response by employees at uncontrolled hazardous waste sites—(1) Emergency response plan.* (i) An emergency response plan shall be developed and implemented by all employers within the scope of paragraphs (a)(1)(i)–(ii) of this section to handle anticipated emergencies prior to the commencement of hazardous waste operations. The plan shall be in writing and available for inspection and copying by employees, their representatives, OSHA personnel and other governmental agencies with relevant responsibilities.

[1910.120(l)(1)(i) revised, effective April 13, 1990, by 55 FR 14073, April 13, 1990]

(ii) Employers who will evacuate their employees from the danger area when an emergency occurs, and who do not permit any of their employees to assist in handling the emergency, are exempt from the requirements of this paragraph if they provide an emergency action plan complying with section 1910.38(a) of this part.

[1910.120(l)(1)(ii) revised, effective April 13, 1990, by 55 FR 14073, April 13, 1990]

(2) *Elements of an emergency response plan.* The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following:

(i) Pre-emergency planning.

(ii) Personnel roles, lines of authority, and communication.

(iii) Emergency recognition and prevention.

(iv) Safe distances and places of refuge.

(v) Site security and control.

[Sec. 1910.120(l)(2)(v)]

(vi) Evacuation routes and procedures.

(vii) Decontamination procedures which are not covered by the site safety and health plan.

(viii) Emergency medical treatment and first aid.

(ix) Emergency alerting and response procedures.

(x) Critique of response and follow-up.

(xi) PPE and emergency equipment.

(3) *Procedures for handling emergency incidents.* (i) In addition to the elements for the emergency response plan required in paragraph (1)(2) of this section, the following elements shall be included for emergency response plans:

(A) Site topography, layout, and prevailing weather conditions.

(B) Procedures for reporting incidents to local, state, and federal governmental agencies.

(ii) The emergency response plan shall be a separate section of the Site Safety and Health Plan.

(iii) The emergency response plan shall be compatible and integrated with the disaster, fire and/or emergency response plans of local, state, and federal agencies.

(iv) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.

(v) The site emergency response plan shall be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.

(vi) An employee alarm system shall be installed in accordance with 29 CFR 1910.165 to notify employees of an emergency situation; to stop work activities if necessary; to lower background noise in order to speed communication; and to begin emergency procedures.

(vii) Based upon the information available at time of the emergency, the employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the site emergency response plan.

(m) *Illumination.* Areas accessible to employees shall be lighted to not less than the minimum illumination intensities listed in the following Table H-120.1 while any work is in progress:

TABLE H-120.1.—Minimum Illumination Intensities in Foot-Candles

Foot-candles	Area or operations
5	General site areas.
3	Excavation and waste areas, accessways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors. Warehouses, corridors, hallways, and exitways.
5	Tunnels, shafts, and general underground work areas. (Exception: Minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Mine Safety and Health Administration approved cap lights shall be acceptable for use in the tunnel heading.)
10	General shops (e.g., mechanical and electrical equipment rooms, active storerooms, barracks or living quarters, locker or dressing rooms, dining areas, and indoor toilets and workrooms.)
30	First aid stations, infirmaries, and offices.

(n) *Sanitation at temporary work-places.*—(1) *Potable water.* (i) An adequate supply of potable water shall be provided on the site.

(ii) Portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap. Water shall not be dipped from containers.

(iii) Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose.

(iv) Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

(2) *Nonpotable water.* (i) Outlets for nonpotable water, such as water for firefighting purposes, shall be identified to indicate clearly that the water is unsafe and is not to be used for drinking, washing, or cooking purposes.

(ii) There shall be no cross-connection, open or potential, between a system furnishing potable water and a system furnishing nonpotable water.

(3) *Toilet facilities.* (i) Toilets shall be provided for employees according to the following Table H-120.2.

TABLE H-120.2.—TOILET FACILITIES

Number of employees	Minimum number of facilities
20 or fewer	One.
More than 20, fewer than 200.	One toilet seat and one urinal per 40 employees.
More than 200.	One toilet seat and one urinal per 50 employees.

(ii) Under temporary field conditions, provisions shall be made to assure that at least one toilet facility is available.

(iii) Hazardous waste sites not provided with a sanitary sewer shall be provided with the following toilet facilities unless prohibited by local codes:

(A) Chemical toilets;

(B) Recirculating toilets;

(C) Combustion toilets; or

(D) Flush toilets.

(iv) The requirements of this paragraph for sanitation facilities shall not apply to mobile crews having transportation readily available to nearby toilet facilities.

(v) Doors entering toilet facilities shall be provided with entrance locks controlled from inside the facility.

(4) *Food handling.* All food service facilities and operations for employees shall meet the applicable laws, ordinances, and regulations of the jurisdictions in which they are located.

(5) *Temporary sleeping quarters.* When temporary sleeping quarters are provided, they shall be heated, ventilated, and lighted.

(6) *Washing facilities.* The employer shall provide adequate washing facilities for employees engaged in operations where hazardous substances may be harmful to employees. Such facilities shall be in near proximity to the worksite; in areas where exposures are below permissible exposure limits and published exposure levels and which are under the controls of the employer; and shall be so equipped as to enable employees to remove hazardous substances from themselves.

(7) *Showers and change rooms.* When hazardous waste clean-up or removal operations commence on a site and the duration of the work will require six months or greater time to complete, the employer shall provide showers and change rooms for all employees exposed

[Sec. 1910.120(n)(7)]

to hazardous substances and health hazards involved in hazardous waste clean-up or removal operations.

(i) Showers shall be provided and shall meet the requirements of 29 CFR 1910.141(d)(3).

(ii) Change rooms shall be provided and shall meet the requirements of 29 CFR 1910.141(e). Change rooms shall consist of two separate change areas separated by the shower area required in paragraph (n)(7)(i) of this section. One change area, with an exit leading off the worksite, shall provide employees with a clean area where they can remove, store, and put on street clothing. The second area, with an exit to the worksite, shall provide employees with an area where they can put on, remove and store work clothing and personal protective equipment.

(iii) Showers and change rooms shall be located in areas where exposures are below the permissible exposure limits and published exposure levels. If this cannot be accomplished, then a ventilation system shall be provided that will supply air that is below the permissible exposure limits and published exposure levels.

(iv) Employers shall assure that employees shower at the end of their work shift and when leaving the hazardous waste site.

(o) *New technology programs.* (1) The employer shall develop and implement procedures for the introduction of effective new technologies and equipment developed for the improved protection of employees working with hazardous waste clean-up operations, and the same shall be implemented as part of the site safety and health program to assure that employee protection is being maintained.

(2) New technologies, equipment or control measures available to the industry, such as the use of foams, absorbents, adsorbents, neutralizers, or other means to suppress the level of air contaminants while excavating the site or for spill control, shall be evaluated by employers or their representatives. Such an evaluation shall be done to determine the effectiveness of the new methods, materials, or equipment before implementing their use on a large scale for enhancing employee protection. Information and data from manufacturers or suppliers may be used as part of the employer's evaluation effort. Such evaluations shall be made available to OSHA upon request.

(p) *Certain Operations Conducted Under the Resource Conservation and Recovery Act of 1976 (RCRA).* Employers conducting operations at treatment, storage, and disposal (TSD) facilities specified in paragraph (a)(1)(iv) of this section shall provide and implement the programs specified in this paragraph. See the "Notes and Exceptions" to paragraph (a)(2)(iii) of this section for employers not covered.

[1910.120(p) revised, effective April 13, 1990, by 55 FR 14073, April 13, 1990]

(1) *Safety and health program.* The employer shall develop and implement a written safety and health program for employees involved in hazardous waste operations that shall be available for inspection by employees, their representatives and OSHA personnel. The program shall be designed to identify, evaluate and control safety and health hazards in their facilities for the purpose of employee protection, to provide for emergency response meeting the requirements of paragraph (p)(8) of this section and to address as appropriate site analysis, engineering controls, maximum exposure limits, hazardous waste handling procedures and uses of new technologies.

(2) *Hazard communication program.* The employer shall implement a hazard communication program meeting the requirements of 29 CFR 1910.1200 as part of the employer's safety and program.

Note to 1910.120.—The exemption for hazardous waste provided in § 1910.1200 is applicable to this section.

(3) *Medical surveillance program.* The employer shall develop and implement a medical surveillance program meeting the requirements of paragraph (f) of this section.

(4) *Decontamination program.* The employer shall develop and implement a decontamination procedure meeting the requirements of paragraph (k) of this section.

(5) *New technology program.* The employer shall develop and implement procedures meeting the requirements of paragraph (o) of this section for introducing new and innovative equipment into the workplace.

(6) *Material handling program.* Where employees will be handling drums or containers, the employer shall develop and implement procedures meeting the requirements of paragraphs (j)(1) (ii) through (viii) and (xi) of this section, as well as (j)(3) and (j)(8) of this section prior to starting such work.

(7) *Training program—(i) New employees.* The employer shall develop and implement a training program, which is part of the employer's safety and health program, for employees exposed to health hazards or hazardous substances at TSD operations to enable the employees to perform their assigned duties and functions in a safe and healthful manner so as not endanger themselves or other employees. The initial training shall be for 24 hours and refresher training shall be for eight hours annually. Employees who have received the initial training required by this paragraph shall be given a written certificate attesting that they have successfully completed the necessary training.

[1910.120(p)(7)(i) revised, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

(ii) *Current employees.* Employers who can show by an employee's previous work experience and/or training that the employee has had training equivalent to the initial training required by this paragraph, shall be considered as meeting the initial training requirements of this paragraph as to that employee. Equivalent training includes the training that existing employees might have already received from actual site work experience. Current employees shall receive eight hours of refresher training annually.

(iii) *Trainers.* Trainers who teach initial training shall have satisfactorily completed a training course for teaching the subjects they are expected to teach or they shall have the academic credentials and instruction experience necessary to demonstrate a good command of the subject matter of the courses and competent instructional skills.

(8) *Emergency response program—(i) Emergency response plan.* An emergency response plan shall be developed and implemented by all employers. Such plans need not duplicate any of the subjects fully addressed in the employer's contingency planning required by permits, such as those issued by the U.S. Environmental Protection Agency, provided that the contingency plan is made part of the emergency response plan. The emergency response plan shall be a written portion of the employer's safety and health program required in paragraph (p)(1) of this section. Employers who will evacuate their employees from the worksite location when an emergency occurs and who do not permit any of their employees to

[Sec. 1910.120(p)(8)(i)]

assist in handling the emergency are exempt from the requirements of paragraph (p)(8) if they provide an emergency action plan complying with § 1910.38(a) of this part.

(ii) *Elements of an emergency response plan.* The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following areas to the extent that they are not addressed in any specific program required in this paragraph:

(A) Pre-emergency planning and coordination with outside parties.

(B) Personnel roles, lines of authority, and communication.

(C) Emergency recognition and prevention.

(D) Safe distances and places of refuge.

(E) Site security and control.

(F) Evacuation routes and procedures.

(G) Decontamination procedures.

(H) Emergency medical treatment and first aid.

(I) Emergency alerting and response procedures.

(J) Critique of response and follow-up.

(K) PPE and emergency equipment.

(iii) *Training.* (A) Training for emergency response employees shall be completed before they are called upon to perform in real emergencies. Such training shall include the elements of the emergency response plan, standard operating procedures the employer has established for the job, the personal protective equipment to be worn and procedures for handling emergency incidents.

Exception #1: An employer need not train all employees to the degree specified if the employer divides the work force in a manner such that a sufficient number of employees who have responsibility to control emergencies have the training specified, and all other employees, who may first respond to an emergency incident, have sufficient awareness training to recognize that an emergency response situation exists and that they are instructed in that case to summon the fully trained employees and not attempt control activities for which they are not trained.

Exception #2: An employer need not train all employees to the degree specified if arrangements have been made in advance for an outside fully-trained emergency response team to respond in a reasonable period and all employees, who may come to the incident first, have sufficient awareness training to recognize that an emergency response situation exists and they have been instructed to

call the designated outside fully-trained emergency response team for assistance.

(B) Employee members of TSD facility emergency response organizations shall be trained to a level of competence in the recognition of health and safety hazards to protect themselves and other employees. This would include training in the methods used to minimize the risk from safety and health hazards; in the safe use of control equipment; in the selection and use of appropriate personal protective equipment; in the safe operating procedures to be used at the incident scene; in the techniques of coordination with other employees to minimize risks; in the appropriate response to over exposure from health hazards or injury to themselves and other employees; and in the recognition of subsequent symptoms which may result from over exposures.

(C) The employer shall certify that each covered employee has attended and successfully completed the training required in paragraph (p)(8)(iii) of this section, or shall certify the employee's competency at least yearly. The method used to demonstrate competency for certification of training shall be recorded and maintained by the employer.

(iv) *Procedures for handling emergency incidents.* (A) In addition to the elements for the emergency response plan required in paragraph (p)(8)(ii) of this section, the following elements shall be included for emergency response plans to the extent that they do not repeat any information already contained in the emergency response plan:

(1) Site topography, layout, and prevailing weather conditions.

(2) Procedures for reporting incidents to local, state, and federal governmental agencies.

(B) The emergency response plan shall be compatible and integrated with the disaster, fire and/or emergency response plans of local, state, and federal agencies.

(C) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.

(D) The site emergency response plan shall be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.

(E) An employee alarm system shall be installed in accordance with 29 CFR

1910.165 to notify employees of an emergency situation; to stop work activities if necessary; to lower background noise in order to speed communication; and to begin emergency procedures.

(F) Based upon the information available at time of the emergency, the employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the site emergency response plan.

(q) *Emergency response to hazardous substance releases.* This paragraph covers employers whose employees are engaged in emergency response no matter where it occurs except that it does not cover employees engaged in operations specified in paragraphs (a)(1)(i) through (a)(1)(iv) of this section. Those emergency response organizations who have developed and implemented programs equivalent to this paragraph for handling releases of hazardous substances pursuant to section 303 of the Superfund Amendments and Reauthorization Act of 1986 (Emergency Planning and Community Right-to-Know Act of 1986, 42 U.S.C. 11003) shall be deemed to have met the requirements of this paragraph.

(1) *Emergency response plan.* An emergency response plan shall be developed and implemented to handle anticipated emergencies prior to the commencement of emergency response operations. The plan shall be in writing and available for inspection and copying by employees, their representatives and OSHA personnel. Employers who will evacuate their employees from the danger area when an emergency occurs, and who do not permit any of their employees to assist in handling the emergency, are exempt from the requirements of this paragraph if they provide an emergency action plan in accordance with § 1910.38(a) of this part.

[1910.120(q)(1) revised, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

(2) *Elements of an emergency response plan.* The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following to the extent that they are not addressed elsewhere:

(i) Pre-emergency planning and coordination with outside parties.

(ii) Personnel roles, lines of authority, training, and communication.

[Sec. 1910.120(q)(2)(ii)]

(iii) Emergency recognition and prevention.

(iv) Safe distances and places of refuge.

(v) Site security and control.

(vi) Evacuation routes and procedures.

(vii) Decontamination.

(viii) Emergency medical treatment and first aid.

(ix) Emergency alerting and response procedures.

(x) Critique of response and follow-up.

(xi) PPE and emergency equipment.

(xii) Emergency response organizations may use the local emergency response plan or the state emergency response plan or both, as part of their emergency response plan to avoid duplication. Those items of the emergency response plan that are being properly addressed by the SARA Title III plans may be substituted into their emergency plan or otherwise kept together for the employer and employee's use.

(3) *Procedures for handling emergency response.* (i) The senior emergency response official responding to an emergency shall become the individual in charge of a site-specific Incident Command System (ICS). All emergency responders and their communications shall be coordinated and controlled through the individual in charge of the ICS assisted by the senior official present for each employer.

Note to (q)(3)(i).—The "senior official" at an emergency response is the most senior official on the site who has the responsibility for controlling the operations at the site. Initially it is the senior officer on the first-arriving piece of responding emergency apparatus to arrive on the incident scene. As more senior officers arrive (i.e., battalion chief, fire chief, state law enforcement official, site coordinator, etc.) the position is passed up the line of authority which has been previously established.

(ii) The individual in charge of the ICS shall identify, to the extent possible, all hazardous substances or conditions present and shall address as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance handling procedures, and use of any new technologies.

(iii) Based on the hazardous substances and/or conditions present, the individual in charge of the ICS shall implement appropriate emergency operations, and assure that the personal protective equipment worn is appropriate

for the hazards to be encountered. However, personal protective equipment shall meet, at a minimum, the criteria contained in 29 CFR 1910.156(e) when worn while performing fire fighting operations beyond the incipient stage for any incident.

[1910.120(q)(3)(iii) revised, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

(iv) Employees engaged in emergency response and exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard shall wear positive pressure self-contained breathing apparatus while engaged in emergency response, until such time that the individual in charge of the ICS determines through the use of air monitoring that a decreased level of respiratory protection will not result in hazardous exposures to employees.

(v) The individual in charge of the ICS shall limit the number of emergency response personnel at the emergency site, in those areas of potential or actual exposure to incident or site hazards, to those who are actively performing emergency operations. However, operations in hazardous areas shall be performed using the buddy system in groups of two or more.

(vi) Back-up personnel shall stand by with equipment ready to provide assistance or rescue. Advance first aid support personnel, as a minimum, shall also stand by with medical equipment and transportation capability.

(vii) The individual in charge of the ICS shall designate a safety official, who is knowledgeable in the operations being implemented at the emergency response site, with specific responsibility to identify and evaluate hazards and to provide direction with respect to the safety of operations for the emergency at hand.

(viii) When activities are judged by the safety official to be an IDLH condition and/or to involve an imminent danger condition, the safety official shall have the authority to alter, suspend, or terminate those activities. The safety official shall immediately inform the individual in charge of the ICS of any actions needed to be taken to correct these hazards at the emergency scene.

[1910.120(q)(3)(viii) revised, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

(ix) After emergency operations have terminated, the individual in charge of the ICS shall implement appropriate decontamination procedures.

(x) When deemed necessary for meeting the tasks at hand, approved self-contained compressed air breathing apparatus may be used with approved cylinders from other approved self-contained compressed air breathing apparatus provided that such cylinders are of the same capacity and pressure rating. All compressed air cylinders used with self-contained breathing apparatus shall meet U.S. Department of Transportation and National Institute for Occupational Safety and Health criteria.

(4) *Skilled support personnel.* Personnel, not necessarily an employer's own employees, who are skilled in the operation of certain equipment, such as mechanized earth moving or digging equipment or crane and hoisting equipment, and who are needed temporarily to perform immediate emergency support work that cannot reasonably be performed in a timely fashion by an employer's own employees, and who will be or may be exposed to the hazards at an emergency response scene, are not required to meet the training required in this paragraph for the employer's regular employees. However, these personnel shall be given an initial briefing at the site prior to their participation in any emergency response. The initial briefing shall include instruction in the wearing of appropriate personal protective equipment, what chemical hazards are involved, and what duties are to be performed. All other appropriate safety and health precautions provided to the employer's own employees shall be used to assure the safety and health of these personnel.

(5) *Specialist employees.* Employees who, in the course of their regular job duties, work with and are trained in the hazards of specific hazardous substances, and who will be called upon to provide technical advice or assistance at a hazardous substance release incident to the individual in charge, shall receive training or demonstrate competency in the area of their specialization annually.

(6) *Training.* Training shall be based on the duties and function to be performed by each responder of an emergency response organization. The skill and knowledge levels required for all new responders, those hired after the effective date of this standard, shall be conveyed to them through training before they are permitted to take part in actual emergency operations on an incident. Employees who participate, or

[Sec. 1910.120(q)(6)]

are expected to participate, in emergency response, shall be given training in accordance with the following paragraphs:

(i) *First responder awareness level.* First responders at the awareness level are individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. They would take no further action beyond notifying the authorities of the release. First responders at the awareness level shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:

(A) An understanding of what hazardous substances are, and the risks associated with them in an incident.

(B) An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.

(C) The ability to recognize the presence of hazardous substances in an emergency.

(D) The ability to identify the hazardous materials, if possible.

[1910.120(q)(6)(i), (A)-(D) revised, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

(E) An understanding of the role of the first responder awareness individual in the employer's emergency response plan including site security and control and the U.S. Department of Transportation's Emergency Response Guidebook.

(F) The ability to realize the need for additional resources, and to make appropriate notifications to the communication center.

(ii) *First responder operations level.* First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. First responders at the operational level shall have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed for the awareness level and the employer shall so certify:

(A) Knowledge of the basic hazard and risk assessment techniques.

(B) Know how to select and use proper personal protective equipment provided to the first responder operational level.

(C) An understanding of basic hazardous materials terms.

(D) Know how to perform basic control, containment and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.

(E) Know how to implement basic decontamination procedures.

(F) An understanding of the relevant standard operating procedures and termination procedures.

(iii) *Hazardous materials technician.* Hazardous materials technicians are individuals who respond to releases or potential releases for the purpose of stopping the release. They assume a more aggressive role than a first responder at the operations level in that they will approach the point of release in order to plug, patch or otherwise stop the release of a hazardous substance. Hazardous materials technicians shall have received at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:

(A) Know how to implement the employer's emergency response plan.

(B) Know the classification, identification and verification of known and unknown materials by using field survey instruments and equipment.

(C) Be able to function within an assigned role in the Incident Command System.

(D) Know how to select and use proper specialized chemical personal protective equipment provided to the hazardous materials technician.

(E) Understand hazard and risk assessment techniques.

(F) Be able to perform advance control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with the unit.

(G) Understand and implement decontamination procedures.

(H) Understand termination procedures.

(I) Understand basic chemical and toxicological terminology and behavior.

(iv) *Hazardous materials specialist.* Hazardous materials specialists are individuals who respond with and provide support to hazardous materials technicians. Their duties parallel those of the hazardous materials technician, however, those duties require a more directed or specific knowledge of the various substances they may be called upon to contain. The hazardous materials specialist would also act as the site liaison with Federal, state, local and other government authorities in regards to site activities. Hazardous materials specialists shall have received at least 24 hours of training equal to the technician level and in addition have competency in the following areas and the employer shall so certify:

(A) Know how to implement the local emergency response plan.

(B) Understand classification, identification and verification of known and unknown materials by using advanced survey instruments and equipment.

(C) Know of the state emergency response plan.

(D) Be able to select and use proper specialized chemical personal protective equipment provided to the hazardous materials specialist.

(E) Understand in-depth hazard and risk techniques.

(F) Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.

(G) Be able to determine and implement decontamination procedures.

(H) Have the ability to develop a site safety and control plan.

(I) Understand chemical, radiological and toxicological terminology and behavior.

(v) *On scene incident commander.* Incident commanders, who will assume control of the incident scene beyond the first responder awareness level, shall receive at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:

(A) Know and be able to implement the employer's incident command system.

(B) Know how to implement the employer's emergency response plan.

[Sec. 1910.120(q)(6)(v)(B)]

(C) Know and understand the hazards and risks associated with employees working in chemical protective clothing.

(D) Know how to implement the local emergency response plan.

(E) Know of the state emergency response plan and of the Federal Regional Response Team.

(F) Know and understand the importance of decontamination procedures.

(7) *Trainers.* Trainers who teach any of the above training subjects shall have satisfactorily completed a training course for teaching the subjects they are expected to teach, such as the courses offered by the U.S. National Fire Academy, or they shall have the training and/or academic credentials and instructional experience necessary to demonstrate competent instructional skills and a good command of the subject matter of the courses they are to teach.

[1910.120(q)(7) revised, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

(8) *Refresher training.* (i) Those employees who are trained in accordance with paragraph (q)(6) of this section shall receive annual refresher training of sufficient content and duration to maintain their competencies, or shall demonstrate competency in those areas at least yearly.

(ii) A statement shall be made of the training or competency, and if a statement of competency is made, the employer shall keep a record of the methodology used to demonstrate competency.

(9) *Medical surveillance and consultation.* (i) Members of an organized and designated HAZMAT team and hazardous materials specialists shall receive a baseline physical examination and be provided with medical surveillance as required in paragraph (f) of this section.

(ii) Any emergency response employees who exhibits signs or symptoms which may have resulted from exposure to hazardous substances during the course of an emergency incident, either immediately or subsequently, shall be provided with medical consultation as required in paragraph (f)(3)(ii) of this section.

(10) *Chemical protective clothing.* Chemical protective clothing and equipment to be used by organized and designated HAZMAT team members, or to be used by hazardous materials specialists, shall meet the requirements of

paragraphs (g) (3) through (5) of this section.

(11) *Post-emergency response operations.* Upon completion of the emergency response, if it is determined that it is necessary to remove hazardous substances, health hazards, and materials contaminated with them (such as contaminated soil or other elements of the natural environment) from the site of the incident, the employer conducting the clean-up shall comply with one of the following:

(i) Meet all of the requirements of paragraphs (b) through (c) of this section; or

(ii) Where the clean-up is done on plant property using plant or workplace employees, such employees shall have completed the training requirements of the following: 29 CFR 1910.38(a); 1910.134; 1910.1200, and other appropriate safety and health training made necessary by the tasks that they are expected to be performed such as personal protective equipment and decontamination procedures. All equipment to be used in the performance of the clean-up work shall be in serviceable condition and shall have been inspected prior to use.

APPENDICES TO § 1910.120—HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE

Note: The following appendices serve as non-mandatory guidelines to assist employees and employers in complying with the appropriate requirements of this section. However paragraph 1910.120(g) makes mandatory in certain circumstances the use of Level A and Level B PPE protection.

APPENDIX A—PERSONAL PROTECTIVE EQUIPMENT TEST METHODS

This appendix sets forth the non-mandatory examples of tests which may be used to evaluate compliance with § 1910.120 (g)(4) (ii) and (iii). Other tests and other challenge agents may be used to evaluate compliance.

A. *Totally-encapsulating chemical protective suit pressure test*

1.0—Scope

1.1 This practice measures the ability of a gas tight totally-encapsulating chemical protective suit material, seams, and closures to maintain a fixed positive pressure. The results of this practice allow the gas tight integrity of a totally-encapsulating chemical protective suit to be evaluated.

1.2 Resistance of the suit materials to permeation, penetration, and degradation by specific hazardous substances is not determined by this test method.

2.0—Definition of terms

2.1 "*Totally-encapsulating chemical protective suit (TECP suit)*" means a full body garment which is constructed of protective clothing materials; covers the wearer's torso, head, arms, legs and respirator; may cover the wearer's hands and feet with tightly attached gloves and boots; completely encloses the wearer and respirator by itself or in combination with the wearer's gloves and boots.

2.2 "*Protective clothing material*" means any material or combination of materials used in an item of clothing for the purpose of isolating parts of the body from direct contact with a potentially hazardous liquid or gaseous chemicals.

2.3 "*Gas tight*" means, for the purpose of this test method, the limited flow of a gas under pressure from the inside of a TECP suit to atmosphere at a prescribed pressure and time interval.

3.0—Summary of test method

3.1 The TECP suit is visually inspected and modified for the test. The test apparatus is attached to the suit to permit inflation to the pre-test suit expansion pressure for removal of suit wrinkles and creases. The pressure is lowered to the test pressure and monitored for three minutes. If the pressure drop is excessive, the TECP suit fails the test and is removed from service. The test is repeated after leak location and repair.

4.0—Required Supplies

4.1 Source of compressed air.

4.2 Test apparatus for suit testing, including a pressure measurement device with a sensitivity of at least ¼ inch water gauge.

4.3 Vent valve closure plugs or sealing tape.

4.4 Soapy water solution and soft brush.

4.5 Stop watch or appropriate timing device.

5.0—Safety Precautions

5.1 Care shall be taken to provide the correct pressure safety devices required for the source of compressed air used.

6.0—Test Procedure

6.1 Prior to each test, the tester shall perform a visual inspection of the suit. Check the suit for seam integrity by visually examining the seams and gently pulling on the seams. Ensure that all air supply lines, fittings, visor, zippers, and valves are secure and show no signs of deterioration.

6.1.1 Seal off the vent valves along with any other normal inlet or exhaust points (such as umbilical air line fittings or face piece opening) with tape or other appropriate means (caps, plugs, fixture, etc.). Care should be exercised in the sealing process not to damage any of the suit components.

6.1.2 Close all closure assemblies.

6.1.3 Prepare the suit for inflation by providing an improvised connection point on the suit for connecting an airline. Attach the pressure test apparatus to the suit to permit suit inflation from a compressed air source equipped with a pressure indicating regulator. The leak tightness of the pressure test apparatus should be tested before and after each test by closing off the end of the tubing attached to the suit and assuring a pressure of three inches water gauge for three minutes can be maintained. If a component is removed for the test, that component shall be

[Sec. 1910.120, Appendix A]

replaced and a second test conducted with another component removed to permit a complete test of the ensemble.

6.1.4 The pre-test expansion pressure (A) and the suit test pressure (B) shall be supplied by the suit manufacturer, but in no case shall they be less than: (A)=three inches water gauge; and (B)=two inches water gauge. The ending suit pressure (C) shall be no less than 80 percent of the test pressure (B); i.e., the pressure drop shall not exceed 20 percent of the test pressure (B).

6.1.5 Inflate the suit until the pressure inside is equal to pressure (A), the pre-test expansion suit pressure. Allow at least one minute to fill out the wrinkles in the suit. Release sufficient air to reduce the suit pressure to pressure (B), the suit test pressure. Begin timing. At the end of three minutes, record the suit pressure as pressure (C), the ending suit pressure. The difference between the suit test pressure and the ending suit test pressure (B-C) shall be defined as the suit pressure drop.

6.1.6 If the suit pressure drop is more than 20 percent of the suit test pressure (B) during the three-minute test period, the suit fails the test and shall be removed from service.

7.0—Retest Procedure

7.1 If the suit fails the test check for leaks by inflating the suit to pressure (A) and brushing or wiping the entire suit (including seams, closures, lens gaskets, glove-to-sleeve joints, etc.) with a mild soap and water solution. Observe the suit for the formation of soap bubbles, which is an indication of a leak. Repair all identified leaks.

7.2 Retest the TECP suit as outlined in Test procedure 6.0.

8.0—Report

8.1 Each TECP suit tested by this practice shall have the following information recorded:

8.1.1 Unique identification number, identifying brand name, date of purchase, material of construction, and unique fit features, e.g., special breathing apparatus.

8.1.2 The actual values for test pressures (A), (B), and (C) shall be recorded along with the specific observation times. If the ending pressure (C) is less than 80 percent of the test pressure (B), the suit shall be identified as failing the test. When possible, the specific leak location shall be identified in the test records. Retest pressure data shall be recorded as an additional test.

8.1.3 The source of the test apparatus used shall be identified and the sensitivity of the pressure gauge shall be recorded.

8.1.4 Records shall be kept for each pressure test even if repairs are being made at the test location.

Caution

Visually inspect all parts of the suit to be sure they are positioned correctly and secured tightly before putting the suit back into service. Special care should be taken to examine each exhaust valve to make sure it is not blocked.

Care should also be exercised to assure that the inside and outside of the suit is completely dry before it is put into storage.

B. Totally-encapsulating chemical protective suit qualitative leak test

1.0—Scope

1.1 This practice semi-qualitatively tests gas tight totally-encapsulating chemical protective suit integrity by detecting inward leakage of ammonia vapor. Since no modifications are made to the suit to carry out this test, the results from this practice provide a realistic test for the integrity of the entire suit.

1.2 Resistance of the suit materials to permeation, penetration, and degradation is not determined by this test method. ASTM test methods are available to test suit materials for these characteristics and the tests are usually conducted by the manufacturers of the suits.

2.0—Definition of terms

2.1 "Totally-encapsulating chemical protective suit (TECP suit)" means a full body garment which is constructed of protective clothing materials; covers the wearer's torso, head, arms, legs and respirator; may cover the wearer's hands and feet with tightly attached gloves and boots; completely encloses the wearer and respirator by itself or in combination with the wearer's gloves, and boots.

2.2 "Protective clothing material" means any material or combination of materials used in an item of clothing for the purpose of isolating parts of the body from direct contact with a potentially hazardous liquid or gaseous chemicals.

2.3 "Gas tight" means, for the purpose of this test method, the limited flow of a gas under pressure from the inside of a TECP suit to atmosphere at a prescribed pressure and time interval.

2.4 "Intrusion Coefficient" means a number expressing the level of protection provided by a gas tight totally-encapsulating chemical protective suit. The intrusion coefficient is calculated by dividing the test room challenge agent concentration by the concentration of challenge agent found inside the suit. The accuracy of the intrusion coefficient is dependent on the challenge agent monitoring methods. The larger the intrusion coefficient the greater the protection provided by the TECP suit.

3.0—Summary of recommended practice

3.1 The volume of concentrated aqueous ammonia solution (ammonia hydroxide NH_4OH) required to generate the test atmosphere is determined using the directions outlined in 6.1. The suit is donned by a person wearing the appropriate respiratory equipment (either a positive pressure self-contained breathing apparatus or a positive pressure supplied air respirator) and worn inside the enclosed test room. The concentrated aqueous ammonia solution is taken by the suited individual into the test room and poured into an open plastic pan. A two-minute evaporation period is observed before the test room concentration is measured, using a high range ammonia length of stain detector tube. When the ammonia vapor reaches a concentration of between 1000 and 1200 ppm, the suited individual starts a standardized exercise protocol to stress and flex the suit. After this protocol is completed, the test room concentration is measured again. The suited

individual exits the test room and his stand-by person measures the ammonia concentration inside the suit using a low range ammonia length of stain detector tube or other more sensitive ammonia detector. A stand-by person is required to observe the test individual during the test procedure; aid the person in donning and doffing the TECP suit; and monitor the suit interior. The intrusion coefficient of the suit can be calculated by dividing the average test area concentration by the interior suit concentration. A colorimetric ammonia indicator strip of bromophenol blue or equivalent is placed on the inside of the suit face piece lens so that the suited individual is able to detect a color change and know if the suit has a significant leak. If a color change is observed the individual shall leave the test room immediately.

4.0—Required supplies

4.1 A supply of concentrated aqueous ammonium hydroxide (58 percent by weight).

[1910.120, Appendix A(B.4.1) revised, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

4.2 A supply of bromophenol/blue indicating paper or equivalent, sensitive to 5-10 ppm ammonia or greater over a two-minute period of exposure. (pH 3.0 (yellow) to pH 4.6 (blue))

4.3 A supply of high range (0.5-10 volume percent) and low range (5-700 ppm) detector tubes for ammonia and the corresponding sampling pump. More sensitive ammonia detectors can be substituted for the low range detector tubes to improve the sensitivity of this practice.

4.4 A shallow plastic pan (PVC) at least 12"x14"x1" and a half pint plastic container (PVC) with tightly closing lid.

4.5 A graduated cylinder or other volumetric measuring device of at least 50 milliliters in volume with an accuracy of at least +/- 1 milliliters.

5.0—Safety precautions

5.1 Concentrated aqueous ammonium hydroxide, NH_4OH , is a corrosive volatile liquid requiring eye, skin, and respiratory protection. The person conducting the test shall review the MSDS for aqueous ammonia.

5.2 Since the established permissible exposure limit for ammonia is 35 ppm as a 15 minute STEL, only persons wearing a positive pressure self-contained breathing apparatus or a positive pressure supplied air respirator shall be in the chamber. Normally only the person wearing the totally-encapsulating suit will be inside the chamber. A stand-by person shall have a positive pressure self-contained breathing apparatus, or a positive pressure supplied air respirator available to enter the test area should the suited individual need assistance.

[1910.120, Appendix A(B.5.2) revised, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

5.3 A method to monitor the suited individual must be used during this test. Visual contact is the simplest but other methods using communication devices are acceptable.

5.4 The test room shall be large enough to allow the exercise protocol to be carried out and then to be ventilated to allow for easy

[Sec. 1910.120, Appendix A]

exhaust of the ammonia test atmosphere after the test(s) are completed.

5.5 Individuals shall be medically screened for the use of respiratory protection and checked for allergies to ammonia before participating in this test procedure.

6.0—Test procedure

6.1.1 Measure the test area to the nearest foot and calculate its volume in cubic feet. Multiply the test area volume by 0.2 milliliters of concentrated aqueous ammonia solution per cubic foot of test area volume to determine the approximate volume of concentrated aqueous ammonia required to generate 1000 ppm in the test area.

6.1.2 Measure this volume from the supply of concentrated aqueous ammonia and place it into a closed plastic container.

6.1.3 Place the container, several high range ammonia detector tubes, and the pump in the clean test pan and locate it near the test area entry door so that the suited individual has easy access to these supplies.

6.2.1 In a non-contaminated atmosphere, open a pre-sealed ammonia indicator strip and fasten one end of the strip to the inside of the suit face shield lens where it can be seen by the wearer. Moisten the indicator strip with distilled water. Care shall be taken not to contaminate the detector part of the indicator paper by touching it. A small piece of masking tape or equivalent should be used to attach the indicator strip to the interior of the suit face shield.

6.2.2 If problems are encountered with this method of attachment, the indicator strip can be attached to the outside of the respirator face piece lens being used during the test.

6.3 Don the respiratory protective device normally used with the suit, and then don the TECP suit to be tested. Check to be sure all openings which are intended to be sealed (zippers, gloves, etc.) are completely sealed. DO NOT, however, plug off any venting valves.

6.4 Step into the enclosed test room such as a closet, bathroom, or test booth, equipped with an exhaust fan. No air should be exhausted from the chamber during the test because this will dilute the ammonia challenge concentrations.

6.5 Open the container with the pre-measured volume of concentrated aqueous ammonia within the enclosed test room, and pour the liquid into the empty plastic test pan. Wait two minutes to allow for adequate volatilization of the concentrated aqueous ammonia. A small mixing fan can be used near the evaporation pan to increase the evaporation rate of the ammonia solution.

6.6 After two minutes a determination of the ammonia concentration within the chamber should be made using the high range colorimetric detector tube. A concentration of 1000 ppm ammonia or greater shall be generated before the exercises are started.

6.7 To test the integrity of the suit the following four minute exercise protocol should be followed:

6.7.1 Raising the arms above the head with at least 15 raising motions completed in one minute.

6.7.2 Walking in place for one minute with at least 15 raising motions of each leg in a one-minute period.

6.7.3 Touching the toes with a least 10 complete motions of the arms from above the head to touching of the toes in a one-minute period.

6.7.4 Knee bends with at least 10 complete standing and squatting motions in a one-minute period.

6.8 If at any time during the test the colorimetric indicating paper should change colors, the test should be stopped and section 6.10 and 6.12 initiated (See Para.4.2).

6.9 After completion of the test exercise, the test area concentration should be measured again using the high range colorimetric detector tube.

6.10 Exit the test area.

6.11 The opening created by the suit zipper or other appropriate suit penetration should be used to determine the ammonia concentration in the suit with the low range length of stain detector tube or other ammonia monitor. The internal TECP suit air should be sampled far enough from the enclosed test area to prevent a false ammonia reading.

6.12 After completion of the measurement of the suit interior ammonia concentration the test is concluded and the suit is doffed and the respirator removed.

6.13 The ventilating fan for the test room should be turned on and allowed to run for enough time to remove the ammonia gas. The fan shall be vented to the outside of the building.

6.14 Any detectable ammonia in the suit interior (five ppm ammonia (NH₃) or more for the length of stain detector tube) indicates that the suit has failed the test. When other ammonia detectors are used a lower level of detection is possible, and it should be specified as the pass/fail criteria.

6.15 By following this test method, an intrusion coefficient of approximately 200 or more can be measured with the suit in a completely operational condition. If the intrusion coefficient is 200 or more, then the suit is suitable for emergency response and field use.

7.0—Retest procedures

7.1 If the suit fails this test, check for leaks by following the pressure test in test A above.

7.2 Retest the TECP suit as outlined in the test procedure 6.0.

8.0—Report

8.1 Each gas tight totally-encapsulating chemical protective suit tested by this practice shall have the following information recorded.

8.1.1 Unique identification number, identifying brand name, date of purchase, material of construction, and unique suit features; e.g., special breathing apparatus.

8.1.2 General description of test room used for test.

8.1.3 Brand name and purchase date of ammonia detector strips and color change data.

8.1.4 Brand name, sampling range, and expiration date of the length of stain ammonia detector tubes. The brand name and model of

the sampling pump should also be recorded. If another type of ammonia detector is used, it should be identified along with its minimum detection limit for ammonia.

8.1.5 Actual test results shall list the two test area concentrations, their average, the interior suit concentration, and the calculated intrusion coefficient. Retest data shall be recorded as an additional test.

8.2 The evaluation of the data shall be specified as "suit passed" or "suit failed," and the date of the test. Any detectable ammonia (five ppm or greater for the length of stain detector tube) in the suit interior indicates the suit has failed this test. When other ammonia detectors are used, a lower level of detection is possible and it should be specified as the pass fail criteria.

Caution

Visually inspect all parts of the suit to be sure they are positioned correctly and secured tightly before putting the suit back into service. Special care should be taken to examine each exhaust valve to make sure it is not blocked.

Care should also be exercised to assure that the inside and outside of the suit is completely dry before it is put into storage.

APPENDIX B—GENERAL DESCRIPTION AND DISCUSSION OF THE LEVELS OF PROTECTION AND PROTECTIVE GEAR

This appendix sets forth information about personal protective equipment (PPE) protection levels which may be used to assist employers in complying with the PPE requirements of this section.

As required by the standard, PPE must be selected which will protect employees from the specific hazards which they are likely to encounter during their work on-site.

Selection of the appropriate PPE is a complex process which should take into consideration a variety of factors. Key factors involved in this process are identification of the hazards, or suspected hazards; their routes of potential hazard to employees (inhalation, skin absorption, ingestion, and eye or skin contact); and the performance of the PPE materials (and seams) in providing a barrier to these hazards. The amount of protection provided by PPE is material-hazard specific. That is, protective equipment materials will protect well against some hazardous substances and poorly, or not at all, against others. In many instances, protective equipment materials cannot be found which will provide continuous protection from the particular hazardous substance. In these cases the breakthrough time of the protective material should exceed the work durations.

[1910.120, Appendix B corrected, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

Other factors in this selection process to be considered are matching the PPE to the employee's work requirements and task-specific conditions. The durability of PPE materials, such as tear strength and seam strength, should be considered in relation to the employee's tasks. The effects of PPE in relation to heat stress and task duration are a factor

[Sec. 1910.120, Appendix B]

in selecting and using PPE. In some cases layers of PPE may be necessary to provide sufficient protection, or to protect expensive PPE inner garments, suits or equipment.

The more that is known about the hazards at the site, the easier the job of PPE selection becomes. As more information about the hazards and conditions at the site becomes available, the site supervisor can make decisions to up-grade or down-grade the level of PPE protection to match the tasks at hand.

The following are guidelines which an employer can use to begin the selection of the appropriate PPE. As noted above, the site information may suggest the use of combinations of PPE selected from the different protection levels (i.e., A, B, C, or D) as being more suitable to the hazards of the work. It should be cautioned that the listing below does not fully address the performance of the specific PPE material in relation to the specific hazards at the job site, and that PPE selection, evaluation and re-selection is an ongoing process until sufficient information about the hazards and PPE performance is obtained.

Part A. Personal protective equipment is divided into four categories based on the degree of protection afforded. (See Part B of this appendix for further explanation of Levels A, B, C, and D hazards.)

I. Level A—To be selected when the greatest level of skin, respiratory, and eye protection is required.

The following constitute Level A equipment; it may be used as appropriate:

1. Positive pressure, full face-piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA, approved by the National Institute for Occupational Safety and Health (NIOSH).
2. Totally-encapsulating chemical-protective suit.
3. Coveralls.¹
4. Long underwear.¹
5. Gloves, outer, chemical-resistant.
6. Gloves, inner, chemical-resistant.
7. Boots, chemical-resistant, steel toe and shank.
8. Hard hat (under suit).¹
9. Disposable protective suit, gloves and boots (depending on suit construction, may be worn over totally-encapsulating suit).

II. Level B—The highest level of respiratory protection is necessary but a lesser level of skin protection is needed.

The following constitute Level B equipment; it may be used as appropriate.

1. Positive pressure, full-facepiece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved).
2. Hooded chemical-resistant clothing (overall and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls).
3. Coveralls.¹
4. Gloves, outer, chemical-resistant.

¹ Optional, as applicable.

5. Gloves, inner, chemical-resistant.
6. Boots, outer, chemical-resistant steel toe and shank.
7. Boot-covers, outer, chemical-resistant (disposable).¹
8. Hard hat.¹
9. [Reserved]
10. Face shield.¹

III. Level C—The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air purifying respirators are met.

The following constitute Level C equipment; it may be used as appropriate.

1. Full-face or half-mask, air purifying respirators (NIOSH approved).
2. Hooded chemical-resistant clothing (overall; two-piece chemical-splash suit; disposable chemical-resistant overalls).
3. Coveralls.¹
4. Gloves, outer, chemical-resistant.
5. Gloves, inner, chemical-resistant.
6. Boots (outer), chemical-resistant steel toe and shank.¹
7. Boot-covers, outer, chemical-resistant (disposable).¹
8. Hard hat.¹
9. Escape mask.¹
10. Face shield.¹

IV. Level D—A work uniform affording minimal protection, used for nuisance contamination only.

The following constitute Level D equipment; it may be used as appropriate:

1. Coveralls.
2. Gloves.¹
3. Boots/shoes, chemical-resistant steel toe and shank.
4. Boots, outer, chemical-resistant (disposable).¹
5. Safety glasses or chemical splash goggles.¹
6. Hard hat.¹
7. Escape mask.¹
8. Face shield.¹

Part B. The types of hazards for which levels A, B, C, and D protection are appropriate are described below:

I. Level A—Level A protection should be used when:

1. The hazardous substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either the measured (or potential for) high concentration of atmospheric vapors, gases, or particulates; or the site operations and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the skin:

2. Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible; or

3. Operations are being conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level A have not yet been determined.

II. Level B—Level B protection should be used when:

1. The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection:

2. The atmosphere contains less than 19.5 percent oxygen; or

3. The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin.

Note: This involves atmospheres with IDLH concentrations of specific substances that present severe inhalation hazards and that do not represent a severe skin hazard; or that do not meet the criteria for use of air-purifying respirators.

III. Level C—Level C protection should be used when:

1. The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin;

2. The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove the contaminants; and

3. All criteria for the use of air-purifying respirators are met.

IV. Level D—Level D protection should be used when:

1. The atmosphere contains no known hazard; and

2. Work functions preclude splashes, immersion, or the potential for unexpected inhalation or contact with hazardous levels of any chemicals.

Note: As stated before, combinations of personal protective equipment other than those described for Levels A, B, C, and D protection may be more appropriate and may be used to provide the proper level of protection.

As an aid in selecting suitable chemical protective clothing, it should be noted that the National Fire Protection Association is developing standards on chemical protective clothing. These standards are currently undergoing public review prior to adoption, including:

NFPA 1991—Standard on Vapor-Protective Suits for Hazardous Chemical Emergencies (EPA Level A Protective Clothing)

NFPA 1992—Standard on Liquid Splash-Protective Suits for Hazardous Chemical Emergencies (EPA Level B Protective Clothing)

NFPA 1993—Standard on Liquid Splash-Protective Suits for Non-emergency, Non-flammable Hazardous Chemical Situations (EPA Level B Protective Clothing)

[1910.120, Appendix B, Part B, Level D, revised, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

[Sec. 1910.120, Appendix B]

These standards would apply documentation and performance requirements to the manufacture of chemical protective suits. Chemical protective suits meeting these requirements would be labeled as compliant with the appropriate standard. When these standards are adopted by the National Fire Protection Association, it is recommended that chemical protective suits which meet these standards be used.

APPENDIX C—COMPLIANCE GUIDELINES

1. *Occupational Safety and Health Program.* Each hazardous waste site clean-up effort will require an occupational safety and health program headed by the site coordinator or the employer's representative. The purpose of the program will be the protection of employees at the site and will be an extension of the employer's overall safety and health program. The program will need to be developed before work begins on the site and implemented as work proceeds as stated in paragraph (b). The program is to facilitate coordination and communication of safety and health issues among personnel responsible for the various activities which will take place at the site. It will provide the overall means for planning and implementing the needed safety and health training and job orientation of employees who will be working at the site. The program will provide the means for identifying and controlling work-site hazards and the means for monitoring program effectiveness. The program will need to cover the responsibilities and authority of the site coordinator or the employer's manager on the site for the safety and health of employees at the site, and the relationships with contractors or support services as to what each employer's safety and health responsibilities are for their employees on the site. Each contractor on the site needs to have its own safety and health program so structured that it will smoothly interface with the program of the site coordinator or principal contractor.

Also those employers involved with treating, storing or disposal of hazardous waste as covered in paragraph (p) must have implemented a safety and health program for their employees. This program is to include the hazard communication program required in paragraph (p)(1) and the training required in paragraphs (p)(7) and (p)(8) as parts of the employers comprehensive overall safety and health program. This program is to be in writing.

Each site or workplace safety and health program will need to include the following: (1) Policy statements of the line of authority and accountability for implementing the program, the objectives of the program and the role of the site safety and health supervisor or manager and staff; (2) means or methods for the development of procedures for identifying and controlling workplace hazards at the site; (3) means or methods for the development and communication to employees of the various plans, work rules, standard operating procedures and practices that pertain to individual employees and supervisors; (4) means for the training of supervisors and employees to develop the needed skills and knowledge to perform their work in a safe

and healthful manner; (5) means to anticipate and prepare for emergency situations; and (6) means for obtaining information feedback to aid in evaluating the program and for improving the effectiveness of the program. The management and employees should be trying continually to improve the effectiveness of the program thereby enhancing the protection being afforded those working on the site.

Accidents on the site or workplace should be investigated to provide information on how such occurrences can be avoided in the future. When injuries or illnesses occur on the site or workplace, they will need to be investigated to determine what needs to be done to prevent this incident from occurring again. Such information will need to be used as feedback on the effectiveness of the program and the information turned into positive steps to prevent any recurrence. Receipt of employee suggestions or complaints relating to safety and health issues involved with site or workplace activities is also a feedback mechanism that can be used effectively to improve the program and may serve in part as an evaluative tool(s).

For the development and implementation of the program to be the most effective, professional safety and health personnel should be used. Certified Safety Professionals, Board Certified Industrial Hygienists or Registered Professional Safety Engineers are good examples of professional stature for safety and health managers who will administer the employer's program.

2. *Training.* The training programs for employees subject to the requirements of paragraph (e) of this standard should address: the safety and health hazards employees should expect to find on hazardous waste clean-up sites; what control measures or techniques are effective for those hazards; what monitoring procedures are effective in characterizing exposure levels; what makes an effective employer's safety and health program; what a site safety and health plan should include; hands on training with personal protective equipment and clothing they may be expected to use; the contents of the OSHA standard relevant to the employee's duties and function; and, employee's responsibilities under OSHA and other regulations. Supervisors will need training in their responsibilities under the safety and health program and its subject areas such as the spill containment program, the personal protective equipment program, the medical surveillance program, the emergency response plan and other areas.

The training programs for employees subject to the requirements of paragraph (p) of this standard should address: the employers safety and health program elements impacting employees; the hazard communication program; the medical surveillance program; the hazards and the controls for such hazards that employees need to know for their job duties and functions. All require annual refresher training.

The training programs for employees covered by the requirements of paragraph (q) of this standard should address those competencies required for the various levels of response such as: the hazards associated with hazardous substances; hazard identification and awareness; notification of appropriate

persons; the need for and use of personal protective equipment including respirators; the decontamination procedures to be used; preplanning activities for hazardous substance incidents including the emergency response plan; company standard operating procedures for hazardous substance emergency responses; the use of the incident command system and other subjects. Hands-on training should be stressed whenever possible. Critiques done after an incident which include an evaluation of what worked and what did not and how could the incident be better handled the next time may be counted as training time.

For hazardous materials specialists (usually members of hazardous materials teams), the training should address the care, use and/or testing of chemical protective clothing including totally encapsulating suits, the medical surveillance program, the standard operating procedures for the hazardous materials team including the use of plugging and patching equipment and other subject areas.

Officers and leaders who may be expected to be in charge at an incident should be fully knowledgeable of their company's incident command system. They should know where and how to obtain additional assistance and be familiar with the local district's emergency response plan and the state emergency response plan.

Specialist employees such as technical experts, medical experts or environmental experts that work with hazardous materials in their regular jobs, who may be sent to the incident scene by the shipper, manufacturer or governmental agency to advise and assist the person in charge of the incident should have training on an annual basis. Their training should include the care and use of personal protective equipment including respirators; knowledge of the incident command system and how they are to relate to it; and those areas needed to keep them current in their respective field as it relates to safety and health involving specific hazardous substances.

Those skilled support personnel, such as employees who work for public works departments or equipment operators who operate bulldozers, sand trucks, backhoes, etc., who may be called to the incident scene to provide emergency support assistance, should have at least a safety and health briefing before entering the area of potential or actual exposure. These skilled support personnel, who have not been a part of the emergency response plan and do not meet the training requirements, should be made aware of the hazards they face and should be provided all necessary protective clothing and equipment required for their tasks.

There are two National Fire Protection Association standards, NFPA 472—“Standard for Professional Competence of Responders to Hazardous Material Incidents” and NFPA 471—“Recommended Practice for Responding to Hazardous Material Incidents”, which are excellent resource documents to aid fire departments and other emergency response organizations in developing their training program materials. NFPA 472 provides guidance on the skills and knowledge needed for first responder awareness level, first responder

er operations level, hazmat technicians, and hazmat specialist. It also offers guidance for the officer corp who will be in charge of hazardous substance incidents.

[1910.120, Appendix C, Section 2, paragraph added, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

3. *Decontamination.* Decontamination procedures should be tailored to the specific hazards of the site, and may vary in complexity and number of steps, depending on the level of hazard and the employee's exposure to the hazard. Decontamination procedures and PPE decontamination methods will vary depending upon the specific substance, since one procedure or method may not work for all substances. Evaluation of decontamination methods and procedures should be performed, as necessary, to assure that employees are not exposed to hazards by re-using PPE. References in Appendix D may be used for guidance in establishing an effective decontamination program. In addition, the U.S. Coast Guard's Manual, "Policy Guidance for Response to Hazardous Chemical Releases," U.S. Department of Transportation, Washington, DC (COMDTINST M16465.30) is a good reference for establishing an effective decontamination program.

[1910.120, Appendix C, Section 3, revised, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

4. *Emergency response plans.* States, along with designated districts within the states, will be developing or have developed local emergency response plans. These state and district plans should be utilized in the emergency response plans called for in the standard. Each employer should assure that its emergency response plan is compatible with the local plan. The major reference being used to aid in developing the state and local district plans is the *Hazardous Materials Emergency Planning Guide*, NRT-1. The current Emergency Response Guidebook from the U.S. Department of Transportation, CMA's CHEMTREC and the Fire Service Emergency Management Handbook may also be used as resources.

Employers involved with treatment, storage, and disposal facilities for hazardous waste, which have the required contingency plan called for by their permit, would not need to duplicate the same planning elements. Those items of the emergency response plan that are properly addressed in the contingency plan may be substituted into the emergency response plan required in 1910.120 or otherwise kept together for employer and employee use.

5. *Personal protective equipment programs.* The purpose of personal protective clothing and equipment (PPE) is to shield or isolate individuals from the chemical, physical, and biologic hazards that may be encountered at a hazardous substance site.

As discussed in Appendix B, no single combination of protective equipment and clothing is capable of protecting against all hazards. Thus PPE should be used in conjunction with other protective methods and its effectiveness evaluated periodically.

The use of PPE can itself create significant worker hazards, such as heat stress, physical and psychological stress, and impaired vision,

mobility, and communication. For any given situation, equipment and clothing should be selected that provide an adequate level of protection. However, over-protection, as well as under-protection, can be hazardous and should be avoided where possible.

Two basic objectives of any PPE program should be to protect the wearer from safety and health hazards, and to prevent injury to the wearer from incorrect use and/or malfunction of the PPE. To accomplish these goals, a comprehensive PPE program should include hazard identification, medical monitoring, environmental surveillance, selection, use, maintenance, and decontamination of PPE and its associated training.

The written PPE program should include policy statements, procedures, and guidelines. Copies should be made available to all employees, and a reference copy should be made available at the worksite. Technical data on equipment, maintenance manuals, relevant regulations, and other essential information should also be collected and maintained.

6. *Incident command system (ICS).* Paragraph 1910.120(q)(3)(ii) requires the implementation of an ICS. The ICS is an organized approach to effectively control and manage operations at an emergency incident. The individual in charge of the ICS is the senior official responding to the incident. The ICS is not much different than the "command post" approach used for many years by the fire service. During large complex fires involving several companies and many pieces of apparatus, a command post would be established. This enabled one individual to be in charge of managing the incident, rather than having several officers from different companies making separate, and sometimes conflicting, decisions. The individual in charge of the command post would delegate responsibility for performing various tasks to subordinate officers. Additionally, all communications were routed through the command post to reduce the number of radio transmissions and eliminate confusion. However, strategy, tactics, and all decisions were made by one individual.

The ICS is a very similar system, except it is implemented for emergency response to all incidents, both large and small, that involve hazardous substances.

For a small incident, the individual in charge of the ICS may perform many tasks of the ICS. There may not be any, or little, delegation of tasks to subordinates. For example, in response to a small incident, the individual in charge of the ICS, in addition to normal command activities, may become the safety officer and may designate only one employee (with proper equipment) as a back-up to provide assistance if needed. OSHA does recommend, however, that at least two employees be designated as back-up personnel since the assistance needed may include rescue.

To illustrate the operation of the ICS, the following scenario might develop during a small incident, such as an overturned tank truck with a small leak of flammable liquid.

The first responding senior officer would implement and take command of the ICS. That person would size-up the incident and

determine if additional personnel and apparatus were necessary; would determine what actions to take to control the leak; and, determine the proper level of personal protective equipment. If additional assistance is not needed, the individual in charge of the ICS would implement actions to stop and control the leak using the fewest number of personnel that can effectively accomplish the tasks. The individual in charge of the ICS would designate himself as the safety officer and two other employees as a back-up in case rescue may become necessary. In this scenario, decontamination procedures would not be necessary.

A large complex incident may require many employees and difficult, time-consuming efforts to control. In these situations, the individual in charge of the ICS will want to delegate different tasks to subordinates in order to maintain a span of control that will keep the number of subordinates, that are reporting, to a manageable level.

Delegation of task at large incidents may be by location, where the incident scene is divided into sectors, and subordinate officers coordinate activities within the sector that they have been assigned.

Delegation of tasks can also be by function. Some of the functions that the individual in charge of the ICS may want to delegate at a large incident are: medical services; evacuation; water supply; resources (equipment, apparatus); media relations; safety; and, site control (integrate activities with police for crowd and traffic control). Also for a large incident, the individual in charge of the ICS will designate several employees as back-up personnel; and a number of safety officers to monitor conditions and recommend safety precautions.

Therefore, no matter what size or complexity an incident may be, by implementing an ICS there will be one individual in charge who makes the decisions and gives directions; and, all actions, and communications are coordinated through one central point of command. Such a system should reduce confusion, improve safety, organize and coordinate actions, and should facilitate effective management of the incident.

7. *Site Safety and Control Plans.* The safety and security of response personnel and others in the area of an emergency response incident site should be of primary concern to the incident commander. The use of a site safety and control plan could greatly assist those in charge of assuring the safety and health of employees on the site.

A comprehensive site safety and control plan should include the following: summary analysis of hazards on the site and a risk analysis of those hazards; site map or sketch; site work zones (clean zone, transition or decontamination zone, work or hot zone); use of the buddy system; site communications; command post or command center; standard operating procedures and safe work practices; medical assistance and triage area; hazard monitoring plan (air contaminate monitoring, etc.); decontamination procedures and area; and other relevant areas. This plan should be a part of the employer's emergency response plan or an extension of it to the specific site.

[Sec. 1910.120, Appendix C]

8. *Medical surveillance programs.* Workers handling hazardous substances may be exposed to toxic chemicals, safety hazards, biological hazards, and radiation. Therefore, a medical surveillance program is essential to assess and monitor workers' health and fitness for employment in hazardous waste operations and during the course of work; to provide emergency and other treatment as needed; and to keep accurate records for future reference.

The *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* developed by the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA), the U.S. Coast Guard (USCG), and the Environmental Protection Agency (EPA); October 1985 provides an excellent example of the types of medical testing that should be done as part of a medical surveillance program.

9. *New Technology and Spill Containment Programs.* Where hazardous substances may be released by spilling from a container that will expose employees to the hazards of the materials, the employer will need to implement a program to contain and control the spilled material. Diking and ditching, as well as use of absorbents like diatomaceous earth, are traditional techniques which have proven to be effective over the years. However, in recent years new products have come into the marketplace, the use of which complement and increase the effectiveness of these traditional methods. These new products also provide emergency responders and others with additional tools or agents to use to reduce the hazards of spilled materials.

These agents can be rapidly applied over a large area and can be uniformly applied or otherwise can be used to build a small dam, thus improving the workers' ability to control spilled material. These application techniques enhance the intimate contact between the agent and the spilled material allowing for the quickest effect by the agent or quickest control of the spilled material. Agents are available to solidify liquid spilled materials, to suppress vapor generation from spilled materials, and to do both. Some special agents, which when applied as recommended by the manufacturer, will react in a controlled manner with the spilled material to neutralize acids or caustics, or greatly reduce the level of hazard of the spilled material.

There are several modern methods and devices for use by emergency response personnel or others involved with spill control efforts to safely apply spill control agents to control spilled material hazards. These include portable pressurized applicators similar to hand-held portable fire extinguishing devices, and nozzle and hose systems similar to portable fire fighting foam systems which allow the operator to apply the agent without having to come into contact with the spilled material. The operator is able to apply the agent to the spilled material from a remote position.

The solidification of liquids provides for rapid containment and isolation of hazardous substance spills. By directing the agent at run-off points or at the edges of the spill, the reactant solid will automatically create a barrier to slow or stop the spread of the mate-

rial. Clean-up of hazardous substances is greatly improved when solidifying agents, acid or caustic neutralizers, or activated carbon adsorbents are used. Properly applied, these agents can totally solidify liquid hazardous substances or neutralize or absorb them, which results in materials which are less hazardous and easier to handle, transport, and dispose of. The concept of spill treatment, to create less hazardous substances, will improve the safety and level of protection of employees working at spill clean-up operations or emergency response operations to spills of hazardous substances.

The use of vapor suppression agents for volatile hazardous substances, such as flammable liquids and those substances which present an inhalation hazard, is important for protecting workers. The rapid and uniform distribution of the agent over the surface of the spilled material can provide quick vapor knockdown. There are temporary and long-term foam-type agents which are effective on vapors and dusts, and activated carbon adsorption agents which are effective for vapor control and soaking-up of the liquid. The proper use of hose lines or hand-held portable pressurized applicators provides good mobility and permits the worker to deliver the agent from a safe distance without having to step into the untreated spilled material. Some of these systems can be recharged in the field to provide coverage of larger spill areas than the design limits of a single charged applicator unit. Some of the more effective agents can solidify the liquid flammable hazardous substances and at the same time elevate the flashpoint above 140 deg.F so the resulting substance may be handled as a nonhazardous waste material if it meets the U.S. Environmental Protection Agency's 40 CFR part 261 requirements (See particularly § 261.21).

All workers performing hazardous substance spill control work are expected to wear the proper protective clothing and equipment for the materials present and to follow the employer's established standard operating procedures for spill control. All involved workers need to be trained in the established operating procedures; in the use and care of spill control equipment; and in the associated hazards and control of such hazards of spill containment work.

These new tools and agents are the things that employers will want to evaluate as part of their new technology program. The treatment of spills of hazardous substances or wastes at an emergency incident as part of the immediate spill containment and control efforts is sometimes acceptable to EPA and a permit exception is described in 40 CFR 264.1(g)(8) and 265.1(c)(11).

[Sec. 1910.120, Appendix C, Section 9 added, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

APPENDIX D—REFERENCES.

The following references may be consulted for further information on the subject of this standard:

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2. OSHA Instruction DFO CPL 2-2.37A—January 29, 1986, *Technical Assistance and Guidelines for Superfund and Other Hazardous Waste Site Activities.*

3. OSHA Instruction DTS CPL 2.74—January 29, 1986, *Hazardous Waste Activity Form, OSHA 175.*

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[Sec. 1910.120, Appendix C]

16. *Report to the Congress on Hazardous Materials Training, Planning and Preparedness*, Federal Emergency Management Agency, Washington, DC, July 1986.

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[1910.120, Appendix D, Section 18 revised, effective April 13, 1990, by 55 FR 14074, April 13, 1990]

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21. *Hazardous Materials Emergency Planning Guide*, NRT-1, Environmental Protection Agency, Washington, DC, March 1987.

22. *Community Teamwork: Working Together to Promote Hazardous Materials Transportation Safety*, U.S. Department of Transportation, Washington, DC, May 1983.

23. *Disaster Planning Guide for Business and Industry*, Federal Emergency Management Agency, Publication No. FEMA 141, August 1987.

(The Office of Management and Budget has approved the information collection requirements in this section under control number 1218-0319)

[Sec. 1910.120, Appendix D]

APPENDIX B

**FEDERAL FACILITIES AGREEMENT
AND CONSENT ORDER**

TABLE 5 - PRELIMINARY RFI/RI WORKPLANS

TABLE 6 - MILESTONE SCHEDULE

APPENDIX C

TOXICOLOGICAL REFERENCES

TOXICOLOGICAL REFERENCES

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5. Threshold Limit Values and Biological Exposure Indices for 1989-1990, American Conference of Governmental Industrial Hygienists, Cincinnati, OH, 1989.
6. OSHA 3112. Air Contaminants - Permissible Exposure Limits, 29 Code of Federal Regulations 1910.1000.
7. Odor Thresholds for Chemical With Established Occupational Health Standards. American Industrial Hygiene Association, Akron, OH, 1989.

APPENDIX D

DEPARTMENTS CITED IN THIS PLAN

HEALTH AND SAFETY DEPARTMENT

1) Radiological Operations	Dale Hardin	Extension 2826
a. Radiological Operations 707/779/991	Eugene Dicarlo	Extension 5390
b. Radiological Operations 371/374	Larry Rands	Extension 7060
c. Radiological Operations 771/774	Eugene McCracken	Extension 4711
d. Radiological Operations 559/776/777	Steve Fields	Extension 2841
e. Radiological Engineering Non PSZ	John Ray	Extension 2238
2) Radiological Environmental Engineering	Sara Buckle	Extension 4439
a. Radiological Building Engineer	Susan Anderson	Extension 4846
1. Radiological Environmental Engineer	Richard Renee	Extension 5150
b. Radiological Project Engineer	Dick Link	Extension 5771
c. Radiological Support Engineer	Lloyd Burton	Extension 4690
3) Radiological Measurements	Mark Peters	Extension 2322
a. Dosimetry	Joe Aldrich	Extension 2452
b. Radiological Instrumentation	Eugene Crusan	Extension 7279
c. Radiological Measurements Lab	Conrad Trice	Extension 2429
4) Industrial Hygiene	Todd Lewis	Extension 4081
a. IH Operations	Bret Clauson	Extension 7781
b. IH Programs	Bob Cordova	Extension 5827

5) Health and Safety Area Eng	Jack Weaver	Extension 7571
6) Health and Safety Support Systems	Carol Baker	Extension 7968
7) Occupational Safety	Coburn Kennedy	Extension 4369
a. Industrial Safety	Don Burkhart	Extension 7538
b. Construction & Environmental Safety	Larry Ross	Extension 7538
8) Occupational Health	Joe Furman M. D.	Extension 2895
a. Health Services	Patricia Carden	Extension 4696

ENVIRONMENTAL RESTORATION

1) Environmental Restoration	Tom Greengard	Extension 7121
a. Remedial Investigations	Tom Greengard	Extension 7121
b. Remedial Actions	Jim Koffer	Extension 5949
c. Permitting and Compliance	TBD	Extension
d. Program Planning & Control	Eileen Jemison	Extension 2302
e. Remedial Engineering	Gary Anderson	Extension 5747
f. Quality Assurance	Larry McInroy	Extension 279-7242
2) Environmental Monitoring & Assessment	Mike Arndt	Extension 4294
a. Soils, Surface Water, Sediments	Peter Fogler	Extension 5972
b. Hydrogeology, Geophysics	Jim Langman	Extension 5975
c. Air Programs	Wand Busby	Extension 5603
d. Data Management	Greg Underberg	Extension 5970
e. QA Support Systems	Karen Schoendaller	Extension 5958

**3) Clean Air &
Environment
Reporting**

George Setlock

Extension 2453

a. Clean Air Act

David R. Maxwell

Extension 2453

b. Environmental Reporting

TBD

4) Clean Water Act

Farrel Hobbs

Extension 7006

a. Permitting & Compliance

Mark Levin

Extension 4237

b. Surface Water Upgrades

Keith Motyl

Extension 4074

c. Operations & surveillance

Ralph Hawes

Extension 2582

5) NEPA

Laura Frick

Extension 4643

a. Plant Compliance

Kathy London

Extension 2443

b. Remediation & Risk
Assessment

Steve Nesta

Extension 5980

c. Mitigation & Implementation

Dan Shain

Extension 5911

d. Plant & Environment
Impact Statements

Gene Krupp

Extension 5910

6) EG&G Training

Evaln Ruby

Extension 966-6318

GLOSSARY of TERMS

From 29 CFR 1910.120:

"Hazardous Waste Operations and Emergency Response"

Buddy System -

means a system of organizing employees into work groups in such a manner that each employee of the work group is designated to be observed by at least one other employee in the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

Clean-up Operation-

means an operation where hazardous substances are removed, contained, incinerated, neutralized, stabilized, cleared-up, or in any other manner processed or handled with the ultimate goal of making the site safer for people or the environment.

Confined Space Entry -

entry into an area having limited access and (usually) no alternate escape route, having severely limited natural ventilation or an atmosphere containing less than 20% oxygen, and having the capability of accumulating a toxic, flammable, or explosive atmosphere, or being flooded.

Decontamination -

means the removal of hazardous substances from employees and their equipment to the extent necessary to preclude the occurrence of foreseeable adverse health effects.

Emergency Response-

means a response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results or is likely to result, in an uncontrolled release of a hazardous substance. Response to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel are not considered to be emergency responses within the scope of this standard. Responses to releases of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure) are not considered to be emergency responses.

Facility -

A) means any building, structure installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works) well, pit, pond, lagoon, impoundment, ditch, storage container, motor vehicle, rolling stock, or aircraft, or B) any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any water-borne vessel.

Hazardous Substance-

means any substance designated or listed under paragraphs (A) through (D) of this definition, exposure to which results or may result in adverse affects on the health or safety of employees.

A) Any substance defined under section 101(14) of CERCLA:

B) Any biological agent and other disease-causing agent which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any person, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic

mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations in such persons or their offspring;

C) Any substance listed by the U.S. Department of Transportation as hazardous material under 49 CFR 172.101 and appendices; and

D) Hazardous waste as herein defined.

Hazardous Waste -

A) a waste or combination of wastes defined in 40 CFR 261.3 or,

B) those substances defined as hazardous wastes in 49 CFR 171.8.

Hazardous Waste Operations -

means any operation conducted within the scope of this standard.

Hazardous Waste Site or Site -

means any facility or location within the scope of this standard at which hazardous waste operations take place

Health Hazard -

means a chemical, a mixture of chemicals, or a pathogen for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxin, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. It also includes stress due to temperature extremes. Further definition of the terms used above can be found in Appendix A to 29 CFR 1910.1200.

IDLH or Immediately Dangerous to Life or Health -

means an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere.

Medical Surveillance -

A program to monitor an employee's exposure to hazardous or toxic substances. The program includes pre-employment screening, periodic medical examinations (and follow-up examinations when appropriate,) and termination examinations

Oxygen Deficiency -

means that concentration of oxygen by volume below which atmosphere supplying respiratory protection must be provided. It exists in atmospheres where the percentage of oxygen by volume is less than 19.5 percent oxygen.

Permissible Exposure Limit -

means the exposure, inhalation or dermal permissible exposure limit specified in 29 CFR Part 1910, Subparts G and Z.

Published Exposure Level -

means the exposure limits published in "NIOSH Recommendations for Occupational Health Standards" dated 1986 incorporated by reference, or if none is specified, the exposure limits published in the standards specified by the American Conference of Governmental Industrial Hygienists in their publication "Threshold Limit Values and Biological Exposure Indices for 1987-88" dated 1987 incorporated by reference.

Post Emergency -

means that portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and clean-up of the site has begun. If post emergency response is performed by an employer's own employees who were part of the initial emergency response, it is considered to be part of emergency response and not post emergency response. However, if a group of employer's own employees, separate from the group providing initial response, performs the clean-up operations, then the separate group of employees would be considered to be performing post-emergency response and subject to paragraph (q)(11) of this section.

Qualified Person -

means a person with specific training, knowledge and experience in the area for which the person has the responsibility and the authority to control.

Site safety and Safety Supervisor -

means the individual located on a hazardous waste site who is responsible to the employer and has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with applicable safety and health requirements.

Small Quantity Generator -

means a generator of hazardous wastes who in any calendar month generates no more than 1,000 kilograms (2,205 pounds) of hazardous waste in that month

Uncontrolled Hazardous Waste Site -

means an area where an accumulation of hazardous waste creates a threat to the health and safety of individuals or the environment or both. Some sites are found on public lands, such as those created by former municipal, county or state landfills where illegal or poorly managed waste disposal has taken place. Other sites are found on private property, often belonging to generators or former generators of hazardous waste. Examples of such sites include, but are not limited to, surface impoundments, landfills, dumps, and tank or drum farms. Normal operations at TSD sites are not covered by this definition.

Personal protective equipment is divided into four categories based on the degree of protection afforded.

Level A -

a term describing a protection level afforded by using the following personal protective equipment:

- 1) Positive pressure, full-facepiece self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with SCBA, approved by the National Institute for Occupational Safety and Health.

- 2) Totally -encapsulating chemical-protective suit
- 3) Coveralls
- 4) Long underwear
- 5) Inner and outer chemical-resistant gloves
- 6) Chemical resistant boots/shoes
- 7) Hard hat
- 8) Disposable protective suit, gloves, and boots

Level B -

a term describing a protection level afforded by using the following personal protective equipment:

- 1) Positive pressure, full facepiece self contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA, approved by the National Institute for Occupational Safety and Health.
- 2) Chemical-resistant clothing
- 3) Inner and outer chemical-resistant gloves
- 4) Chemical-resistant boots/shoes
- 5) Hard Hat
- 6) Two-way radio

Level C -

a term describing a protection level afforded by using the following personal protective equipment:

- 1) Full-face or half mask, air purifying respirators, approved by the National Institute for Occupational Safety and Health.
- 2) Chemical-resistant clothing
- 3) Inner and outer chemical-resistant gloves
- 4) Chemical resistant boots/shoes
- 5) Hard hat
- 6) Two-way radio

Level D -

a term describing a protection level afforded by using the following personal protective equipment:

- 1) Coveralls
- 2) Chemical resistant boots/shoes
- 3) Safety glasses/chemical splash goggles
- 4) Hard Hat

ACGIH - American Conference of Governmental Industrial Hygienists

AEDE - Annual Effective Dose Equivalent

ASC - Administrative Safety Controls

CAER - Clean Air Environmental Reporting

CBT - Computer Based Training

CDH - Colorado Department of Health

CEDE - Committed Effective Dose Equivalent

CERCLA - Comprehensive Environmental Response, Compensation and Liability Act

CM - Construction Management

CPR - Cardiopulmonary Resuscitation

CWAD - Clean Water Action Division

DAC - Derived Air Concentration

DBA - Decibels, A scale

DOE - Department of Energy

EC - Emergency Coordinator

EMAD - Environmental Monitoring and Assessment Division

EMT - Emergency Medical Technician

EPA - Environmental Protection Agency

ER - Environmental Restoration

ERD - Environmental Restoration Division

ERHSO - Environmental Restoration Health and Safety Officer

FE - Facilities Engineering

FEV/FEC - Forced Expiratory Volume/Forced Vital Capacity

FID - Flame Ionization Detector

FPM -	Facilities Project Manager
GC -	Gas Chromatograph
H&S -	Health and Safety
HSP -	Health and Safety Program
HSPP -	Health and Safety Program Plan
IAG -	Inter-agency Agreement
IDLH -	Immediately Dangerous to Life or Health
IH -	Industrial Hygiene
JSA -	Job Safety Analysis
LEL -	Lower Explosive Limit
LRA -	Lead Regulatory Agency
MSDS -	Material Safety Data Sheet
NEPA -	National Environmental Protection Act Division
NIOSH -	National Institute for Occupational Safety and Health
NPL -	National Priority List
OSA -	Operational Safety Analysis
OSHA -	Occupational Safety and Health Administration
OJT -	On-the-job Training
O ₂ -	Oxygen
OU -	Operable units
PCB -	Polychlorinated Biphenyl
PE -	Project Engineer
PEL -	Permissible Exposure Limit
PID -	Photoionization Detector

PPE - Personal Protective Equipment

RCRA - Resource Conservation and Recovery Act

RFP - Rocky Flats Plant

RI/FS - Remedial Investigation/Feasibility Study

RN - Registered Nurse

SHSC - Site Health and Safety Coordinator

SMAC 23 - A series of tests performed during the medical examinations for the purpose of evaluating liver function

SOP - Standard Operation Procedure

SSO - Site Safety Officer

TRU - Transuranium or Transuranic

TSD - Treatment Storage and Disposal Facility

TWA - Time Weighted Average

WBGT - Wet Bulb Globe Temperature

WO - Waste Operations Procedures